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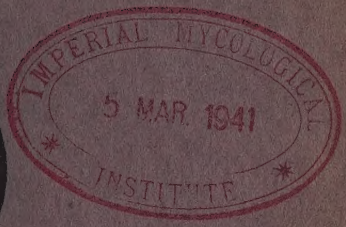

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CONTENTS

LIST OF CHIEF SUBJECTS

[Many subjects dealt with are omitted from the list and will be found in the appropriate places. Particular subjects sometimes appear under different headings: *e.g.* Tuberculosis may appear under :– Diseases Caused by Bacteria and Fungi; Immunity; Diseases, General (papers on several diseases); Public Health; Therapeutics; Technique; Reports and Book Reviews.]

	PAGE
DISEASES CAUSED BY BACTERIA AND FUNGI [see also Immunity]...	145–159
Mastitis	145
Streptococci	146
Tuberculosis	147
Johne's disease	151
Salmonella infection	152
Brucellosis	153
Anaerobic infection	155
Mycosis	157
DISEASES CAUSED BY PROTOZOAN PARASITES	159–161
Trypanosomiasis	159
Coccidiosis	160
Various	160
DISEASES CAUSED BY VIRUSES ...	161–165
Foot and mouth disease	161
Rinderpest	162
Equine infectious anaemia	163
Rabies	164
PARASITES IN RELATION TO DISEASE [ARTHROPODS]	165–166
PARASITES IN RELATION TO DISEASE [HELMINTHS]	166–171
Echinococcus...	167
Nematodes	167
IMMUNITY [including Allergic and Serological Diagnosis] ...	171–178
Tuberculin tests	171
Various	172
DISEASES, GENERAL [General diseases not dealt with under other headings: Organic Diseases, Miscellaneous Diseases and Neoplasms]	178–182
NUTRITION IN RELATION TO DISEASE [see also Diseases, general and Physiology]... ...	182–185
Mineral deficiency	182
Vitamin deficiency	184
PUBLIC HEALTH	185–186
THERAPEUTICS	186–191
Sulphonamide compounds	186
POISONS AND POISONING	191
PHYSIOLOGY	192–195
TECHNIQUE AND APPARATUS	195
MISCELLANEOUS	195–196
REPORTS	196–203
Great Britain	196
Northern Ireland	198
Australia	198
New Zealand	198
Burma	200
Nigeria	201
BOOK REVIEWS	203–206

INDEX TO AUTHORS

Adam, L. C., & Boome, E. J., 205.
Adamy, O., 189.
Aitken, T. See Pierce, H. B., et al., jt. authors, 171.
Alicata, J. E. See Foster, A. O., jt. author, 167.
Allen, J. A., & Kirk, R. J., 204.
Alves de Oliveira, J. J., 145, *bis*.
Anderson, K. See de Monbreun, W. A., jt. author, 159.
Andervont, H. B., 180, 181.
Andreoni, R., 190.
Angulo, L. N., 160.
Anthony, E. L. See Eckles, C. H., et al., jt. authors, 204.
Apinis, P., 194.
Ascoli, A., 175.
Avery, T. B., Scott, H. M., & Conrad, R. M., 190, *bis*.
Augustine, D. L., 169.
Australia. Rep. Wool Bd, 1937, 198.

Bahr, L., 186.
Bailly, J. See Remlinger, P., jt. author, 164.
Baker, D. W., Salisbury, G. W., & Britton, J. W., 170.
Barnard, W. G., 206.
Barnetson, J., 155.
Barrett, H. M., Best, C. H., MacLean, D. L., & Ridout, J. H., 191.
Barry, W. C., 198.
Barth, E. E. See Mills, M. A., et al., jt. authors, 148.
Bates, R. W. See Riddle, O., et al., jt. authors, 192.
Baudet, E. A. R. F., 171.
Bauer, H. See Rosenthal, S. M., jt. author, 187, *bis*.
—. See Rosenthal, S. M., et al., jt. authors, 187.
Bawa, H. S., 162.
Beiling, R., & Oelrichs, L., 164.
Belschner, H. G., 192.
Bendixen, H. C., 153.
Benjamin, M. S. See Henry, M., jt. author, 182.
Best, C. H. See Barrett, H. M., et al., jt. authors, 191.
Binder, C. See Florentin, P., jt. author, 160.
Birago, D., 162.
Biskind, G. R. See Carnes, W. H., jt. author, 188.
Blake, T. A., 193.
Boissevain, C. H., 149.
Boley, L. E. See Graham, R., et al., jt. authors, 151.
Bomford, R. R., 194.
Boome, E. J. See Adam, L. C., jt. author, 205.
Boorsma, H. J. See Prévot, A. R., jt. author, 174.
Boyd, G. H., & Dunn, M., 189.
Brahic-Veyron, J. See Rouslacroix, A., et al., jt. authors, 172.
Brandly, C. A. See Graham, R., et al., jt. authors, 165.
Brief, B. J. See Sutton, T. S., jt. author, 184.
Brit. med. J., 186, *ter*.
de Brito Gutterres, J., 162.
Britton, J. W. See Baker, D. W., et al., jt. authors, 170.
Bruckner, I. E., & Evans, D. G., 177.
Bruner, D. W. See Edwards, P. R., jt. author, 152.
Buonomini, G., 149.
Burma. Rep. civ. vet. Dep., 1937-38, 200.
Burrows, W., 153.

Calvin, D. B. See Mullin, F. J., et al., jt. authors, 195.
Campana. See Rouslacroix, A., et al., jt. authors, 172.
Carnes, W. H., & Biskind, G. R., 188.
Carter, H. B., 192.
Casals, J., & Freund, J., 173.
Chaikoff, I. L., & Connor, C. L., 183.
Chain, E., Florey, H. W., Hardner, A. D., Heatley, N. G., Jennings, M. A., Orr-Ewing, J., & Sanders, A. G., 189.
Challinor, S. W., & Rhodes, A. J., 153.
Charitat, 163.
Chernyshev, G. V., 184.
Cheyne, V. D., 190.
Choucroun, N., 172.
Codling, J. H., 185.
Conn, H. J., 206.
Connor, C. L. See Chaikoff, I. L., jt. author, 183.
Conrad, R. M. See Avery, T. B., et al., jt. authors, 190, *bis*.
Copisarow, M., 164.
Courtade, R. See Descazeaux, J., et al., jt. authors, 187.
Craig, J. F., & Ratter, A., 152.
Crossley, M. L., 186.

Darzins, E., 151.
Davies, R., 150.
Dayus, C. V., 156.
van Deinse, F., 172.
—, Schwartz, R., & Solomidès, J., 173.
Delaune, E. T., & Mayhew, R. L., 167.
Dempsey, E. W., 193.
Denecke, K. See Erhardt, A., jt. author, 169.
Dennis, J. See Mullin, F. J., et al., jt. authors, 195.
Descazeaux, J., Courtade, R., & Rocq, 187.
Dialer, L., 167.
Dilling, W. J., 205.
Dobriner, K., & Rhoads, C. P., 179, 193.
Domagk, G., 187.
Domilescu, G. C., 159.
Dukalov, I. A., 178.
Dunn, M. See Boyd, G. H., jt. author, 189.
Dustin, C. C., & Weyler, H. L. C., 155.

E. Afr. agric. J., 160.
Eckles, C. H., Anthony, E. L., & Palmer, L. S., 204.
Edgar, G., 156.
Edwards, P. R., 152.
—, & Bruner, D. W., 152.
Efimov, A. E., 166.
Eichler, W., 166.
Elberg, S. S., & Meyer, K. F., 157.
Ellenbogen, V. See Olitski, L., jt. author, 152.
Elvove, E. See Rosenthal, S. M., et al., jt. authors, 187.
Elwell, R. A. See Riddle, O., et al., jt. authors, 192.
Emmerson, N. See Harington, C., jt. author, 149.
Emmons, C. W., 157.
Endrejat, E., 166.
Erhardt, A., & Denecke, K., 169.
Evans, D. G., & Maitland, H. B., 177.
—. See also Bruckner, I. E., jt. author, 177.

Fahrenholz, H., 166.
Fairley, N. H., 194.
Falin, L. I., 179.
Farnham, W. B. See Pierce, H. B., et al., jt. authors, 171.
Feldman, W. H. See Stasney, J., et al., jt. authors, 179.
Ferauge, M. A., 147.
Finn, S. B. See Hodge, H. C., jt. author, 190.
Flückiger, G., 161.
Florentin, P., & Binder, C., 160.
Florey, H. W. See Chain, E., et al., jt. authors, 189.
Foote, M. See Hartman, E., et al., jt. authors, 171.
Foster, A. O., & Alicata, J. E., 167.
Foster, R. H. K., 195.
Foulds, L., 180.
Francis, W. D. See Legg, J., jt. author, 191.
Frazer, W. M., & Stallybrass, C. O., 205.
Frei, W., 161.
Freund, J. See Casals, J., jt. author, 173.
Fukusho, K., & Nakamura, J., 163.

Galli-Valerio, B., 160.
Garipuy, A., 176.
Gear, J., & de Meillon, B., 165.
Gilmour, C. C. B., 147.
Glaser, R. W., & Stoll, N. R., 167.
Godden, W., 182.
Gözsy, B., & Vásárhelyi, J., 171.
—. See also Vásárhelyi, J., jt. author, 171.
Golumbic, C., & Mattill, H. A., 183.
Gordon, J., & McLeod, J. W., 157.
Gordon, W. S., Stewart, J., Holman, H. H., & Taylor, A. W., 155.
—. See also Taylor, A. W., jt. author, 156.
Gorshkov, I. P., 189.
Grabar, P., Levenson, S., & Schneierson, S. S., 174.
Gräub, E., Zschokke, W., & Saxer, E., 161.
Graham, R., Brandly, C. A., & Levine, N. D., 165.
—, Boley, L. E., & Levine, N. D., 151.
Great Britain. Rep. colon. adv. Comm., 1937-38, 196.
—. Rep. Imp. Cancer Res. Fund, 1938-40, 196.
—. Rep. Lond. Sch. Hyg., 1938-39, 196.
Gunn, F. D. See Mills, M. A., et al., jt. authors, 148.
Guthrie, W. J., 178.

Hadley, P., 157.
Hamann, E. E., & Huddleson, I. F., 188.
Hamerton, A. E., 166.
Hammond, J., 203.
Hardner, A. D. See Chain, E., et al., jt. authors, 189.
Haring, K., 163.
Harington, C., & Emmerson, N., 149.
Hartman, E., Foote, M., & Pierce, H. B., 171.
Hartman, E. E. See Pierce, H. B., et al., jt. authors, 171.
Heatley, N. G. See Chain, E., et al., jt. authors, 189.
Henderson, W. W., 201.
Henley, R. R., & Le Duc, P. W., 150.
Henry, M., 147.
—, & Benjamin, M. S., 182.
Hindersson, R., 153.
Hindmarsh, W. L., 173.
Hodge, H. C., & Finn, S. B., 190.
Hogan, A. G. See Richardson, L. R., jt. author, 185.
Holman, H. H. See Gordon, W. S., et al., jt. authors, 155.
Hopkirk, C. S. M., 199.
Huber, F. L. See Witjens, J. C., jt. author, 183.
Huddleson, I. F. See Hamann, E. E., jt. author, 188.

Iyer, S. G., 178.

Jennings, M. A. See Chain, E., et al., jt. authors, 189.

J. Coun. sci. industr. Res. Aust., 145.
Jungherr, E., & Wolf, A., 179.

Karady, S., 176.
Keogh, E. V., & Simmons, R. T., 146.
Kernkamp, H. C. H., 164.
Kirchheiner, E., 157.
Kirk, R. J. See Allen, J. A., jt. author, 204.
Koopmansch, 155.
Krembs, J., 158.
Kyes, P., & Potter, T. S., 149.

Lahiri, D. C., 174.
Lahr, E. L. See Riddle, O., et al., jt. authors, 192.
Lancet, 190, 191.
Lansing, A. I., & Miller, D., 183.
Lapage, G., 160.
Launoy, L., 189.
Le Duc, P. W. See Henley, R. R., jt. author, 150.
Legg, J., & Francis, W. D., 191.
Levenson, S. See Grabar, P., et al., jt. authors, 174.
Levine, N. D. See Graham, R., et al., jt. authors, 151, 165.
Linton, R. G., 205.
Lucker, J. T., 169.

McBridge, J. R. B., 165.
McIlwain, H., 147.
McKee, C. M., 176.
McLean, A., 196.
MacLean, D. L. See Barrett, H. M., et al., jt. authors, 191.
McLeod, J. W. See Gordon, J., jt. author, 157.
Macpherson, A. I. S., & Robertson, E. M., 191.
Madsen, T., 153.
Maier, I. See Wilson, G. S., 188.
—. See also Wilson, G. S., et al., jt. authors, 173.
Maitland, H. B. See Evans, D. G., jt. author, 177.
Mattill, H. A. See Golumbic, C., jt. author, 183.
Marshall, E. K., Jr., 186.
Martins, E. V., 164.
Mayhew, R. L., 168.
—. See also Delaune, E. T., jt. author, 167.
de Meillon, B. See Gear, J., jt. author, 165.
Meservey, A. B. See Pierce, H. B., et al., jt. authors, 171, *bis*.
Mettam, R. W. M., 200.
Meyer, K. F. See Elberg, S. S., jt. author, 157.
Miller, D. See Lansing, A. I., jt. author, 183.
Miller, M. J., 170.
Miller, R. A. See Riddle, O., et al., jt. authors, 192.
Mills, M. A., Barth, E. E., & Gunn, F. D., 148.
Mirsky, I. A., 192.
Mitchell, D. T., 200.
de Monbreun, W. A., & Anderson, K., 159.
Moore, L. A., & Sykes, J. F., 184.
Moreira Jacob, M., 145.
Mullin, F. J., Dennis, J., & Calvin, D. B., 195.
Murphy, J. M., 146.

Nagel, A., 173.
Nagler, F. P. O., 174.
Nakamura, J. See Fukusho, K., jt. author, 163.
Nash, T. A. M., 165.
New Zealand. Rep. Livestk Div., Dep. Agric., 1938-39, 198.
—. Rep. vet. Lab., Wallaceville, 1938-39, 199.
Nieberle, K., 180.
Nigeria. Rep. vet. Dep., 1938, 201.
—. Rep. vet. Path., 1938, 202.
Nordström, G., 170.
Northern Ireland. Rep. City Vet., Belfast, 1937, 198.

Oag, R. K., 159, 195.
Oelrichs, L. See Beiling, R., jt. author, 164.
Olitski, L., & Ellenbogen, V., 152.
Orlov, F. M., 158.
Orr-Ewing, J. See Chain, E., et al., jt. authors, 189.
Oxer, D. T., 175.

Palmeiro, J. M., 158, *ter*.
Palmer, L. S. See Eckles, C. H., et al., jt. authors, 204.
Pande, P. G., 151.
Pelozar, M. J., Jr., & Porter, J. R., 184.
Peyron, A., Staub., A., & Poumeau-Delille, G., 176.
Pierce, H. B., Hartman, E. E., Simcox, W. J., Aitken, T., Meservey, A. B., & Farnham, W. B., 171.
—. See also Hartman, E., et al., jt. authors, 171.
Pope, C. G., 177, *bis*.
Popp, W. C. See Stasney, J., et al., jt. authors, 179.
Porter, J. R. See Pelozar, M. J., Jr., jt. author, 184.
Potter, T. S., 149.
—. See also Kyes, P., jt. author, 149.
Poumeau-Delille, G. See Peyron, A., et al., jt. authors, 176.
Prévot, A. R., & Boorsma, H. J., 174.
Proc. 42nd ann. Meet. U.S. Live Stk sanit. Ass., 1938, 164.

Rao, M. V. R., 184.
Ratter, A. See Craig, J. F., jt. author, 152.
Reese, H. W., 152.
Remlinger, P., & Bailly, J., 164.
Reyer, W., 159.
Rhoads, C. P. See Dobriner, K., jt. author, 179, 193.
Rhodes, A. J. See Challinor, S. W., jt. author, 153.
Riboflavin, 185.
Richardson, L. R., & Hogan, A. G., 185.
Riddle, O., Bates, R. W., Schooley, J. P., Lahr, E. L., Smith, G. C., Miller, R. A., & Elwell, L. H., 192.
Ridout, J. H. See Barrett, H. M., et al., jt. authors, 191.
Roberts, F. H. S., 168, *bis*.
Robertson, E. M. See Macpherson, A. I. S., jt. author, 191.
Rocker, G., 147.
Rocq. See Descazeaux, J., et al., jt. authors, 187.
Roetti, C., 165.
Rogers, W. P., 167, 169.
Rosenthal, S. M., & Bauer, H., 187, *bis*.
—, —, & Elvove, E., 187.
Ross, H. E. See Stephenson, D., jt. author, 188.
Rouslacroix, A., Brahic-Veyron, J., & Campana, 172.
Ryu, E., 195.

Sa Viana Conte, H. E., 172.
Salisbury, G. W. See Baker, D. W., et al., jt. authors, 170.
Sanders, A. G. See Chain, E., et al., jt. authors, 189.
Saxer, E. See Gräub, E., et al., jt. authors, 161.
Scherer, H. J., 179.
Schneierson, S. S. See Grabar, P., et al., jt. authors, 174.
Schooley, J. P. See Riddle, O., et al., jt. authors, 192.
Schoop, G., 156.
Schwabacher, H. See Wilson, G. S., et al., jt. authors, 173.
Schwartz, R. See van Deinse, F., et al., jt. authors, 173.
Scott, H. M. See Avery, T. B., et al., jt. authors, 190, *bis*.
Shahi, H. B., 178.
Shrader, J. H., 204.
Simcox, W. J. See Pierce, H. B., et al., jt. authors, 171.
Simons, R. T. See Keogh, E. V., jt. author, 146.
Smith, E. C., 176.
Smith, G. C. See Riddle, O., et al., jt. authors, 192.
Solomidès, J. See van Deinse, F., et al., jt. authors, 173.
Spörri, H., 191.
Stallybrass, C. O. See Frazer, C. O., jt. author, 205.
Stamp, T. C., 146.
Stasney, J., Feldman, W. H., & Popp, W. C., 179.
Staub, A. See Peyron, A., et al., jt. authors, 176.
Stephenson, D., & Ross, H. E., 188.
Stewart, J. See Gordon, W. S., et al., jt. authors, 155.
Stoll, N. R. See Glaser, R. W., jt. author, 167.
Sutton, T. S., & Brief, B. J., 184.
Sykes, J. F. See Moore, L. A., jt. author, 184.
Symeonidis, A., 181.

Taylor, A. W., 155.
—, & Gordon, W. S., 156.
—. See also Gordon, W. S., et al., jt. authors, 155.
Thomsen, A., 153.
Toyoda, K. See Yoshida, S., jt. author, 168.
Troisch, E., 185.

Vallée, H., 176.
Vandenberg, C., 147.
Vásárhelyi, J., & Gözsy, B., 171.
—. See also Gözsy, B., jt. author, 171.
Vet. Med., 183.
Vincent, H., 157.
Volker, J. F., 190.

Ward, A. H., 193.
Wehr, E. E., 170.
Welsch, M., 158.
Weyler, H. L. C. See Dustin, C. C., jt. author, 155.
Willison, G. W., 175.
Wilson, G. S., & Maier, I., 188.
—, Schwabacher, H., & Maier, I., 173.
Winchester, C. F., 192.
Witjens, J. C., & Huber, F. L., 183.
Wolf, A. See Jungherr, E., jt. author, 179.
Woolsey, C. A., 195.

Yegian, D., 149.
Yoshida, S., & Toyoda, K., 168.

Zschokke, W. See Gräub, E., et al., jt. authors, 161.

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin.* Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

The Editor will be glad to receive publications relating to Veterinary Science and cognate subjects in order that they may be dealt with in the *Veterinary Bulletin.*

Reports of Departments, Special Reports, reprints, etc., etc., should be sent as soon as they are issued.

Books for Review.

The Editor will be glad to receive books for review in the *Veterinary Bulletin.*

INDEX VETERINARIUS.

See notice on page 3 of cover.

IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 11.] March, 1941. [No. 3.

DISEASES CAUSED BY BACTERIA AND FUNGI

—. (1940). **Studies on Mastitis in Dairy Cows. Summary of Results of Bacteriological and Clinical Investigations during the first two Lactation Periods in an Experimental Herd.**—*J. Coun. sci. industr. Res. Aust.* **13.** 19–23.

The Council for Scientific and Industrial Research commenced a long term investigation of mastitis in 1935 and the first report has now been prepared. A summary is here published in advance.—W. I. B. Beveridge.

I. Moreira Jacob, M. (1938). A mamite crónica estreptocócica; algumas notas para o seu diagnóstico. **[Diagnosis of Streptococcal Mastitis].**—*Repos. Lab. Pat. vet., Lisboa.* **4.** 163–201. 4 figs. on 4 plates, 3 tables. [Numerous refs.] [English and French summaries].

II. Alves de Oliveira, J. J. (1938). Estreptococos do leite e valor relativo de algumas provas propostas para a sua pesquisa. Mastite estreptocócica, crónica, contagiosa e seu diagnóstico bacteriológico. **[The Identification of Mastitis Streptococci].**—*Ibid.* 277–306. 5 figs. on 2 plates, 4 tables. [English and French summaries].

III. Alves de Oliveira, J. J. (1938). O aquecimento prévio do leite, na determinação do teor leucocitário pelo método de Savage. **[Savage's Leucocyte Count Test for Mastitis].**—*Ibid.* 307–316. 3 figs. on 1 plate, 6 tables. [English and French summaries].

I. The author examined 267 milch cows for streptococcal mastitis.

Of the rapid diagnostic methods the bromthymol-blue test was the most efficient, followed by the estimation of chlorides and the estimation of lactose. Udall and Johnson's method of manual examination of the mammary gland was satisfactory when combined with the bromthymol-blue test. The author considers the leucocyte count to be superfluous if cultural methods are used, and states that centrifugation at over 1,500 revolutions per min. is unsatisfactory as this speed breaks up the long chains of streptococci and makes identification difficult. A better method is incubation of the milk at 37°C. for 24 hours and examination of a film. 78% of infected cases were diagnosed by microscopic examination alone.

Twenty-five strains of streptococci classified as *Str. agalactiae* did not grow on Endo's agar-fuchsin or the lactose-agar medium with rosolic acid.

II. The author isolated 81 strains of streptococci from 112 samples of milk from 28 cows. Cultures made on blood-agar were classified in four groups, *viz*, (1) colonies surrounded by large zones of haemolysis; (2) colonies with narrow and indistinct zones of haemolysis; (3) colonies surrounded by greenish zones, and (4) colonies which did not produce haemolysis or were surrounded by greenish zones of indistinct character after 48 hours at a low temperature.

The strains included in groups 2 and 4 had the typical cultural characters of *Str. mastitidis* in their action on litmus milk, glucose, lactose, etc., differing, however, in their haemolytic properties. They were obtained from appar-

ently normal milk from quarters with clinical signs of chronic mastitis.

Group 3 strains were short chain streptococci, present in undoubted cases of mastitis.

It is suggested that a leucocyte count of 1,000,000 per c.c. should be taken as indicating mastitis.

III. Before the leucocyte count was made the milk was heated up to the first point of boiling, the staining of the leucocytes being thus improved and the count made easier. The count was also higher than with unheated milk and a leucocyte count of more than 500,000 per c.c. was more common in mixed samples as well as in milk from a cow showing no clinical signs of mastitis. This probably explains why a higher leucocyte count is found in pasteurized milk than in raw milk. The author concludes that the figure of 500,000 leucocytes per c.c., accepted by many as the limit for normal milk, requires modification.—MILLER WATSON.

MURPHY, J. M. (1940). **Observations on Differences within the Species Streptococcus Agalactiae.**—*Cornell Vet.* **30.** 261–267. 1 table. [13 refs.]

M. reports the results of a cultural and serological examination of 85 strains of streptococci isolated from 85 quarters in a herd of 144 cows. The strains were tested with group streptococcus sera A, B and C and fell into group B. All the strains fermented dextrose and lactose but not mannitol, inulin, raffinose or sorbitol, split sodium hippurate but not aesculin, and produced no change in methylene-blue milk 1 : 200,000 at 37°C., *i.e.* they showed the characters typical of *Str. agalactiae.*

Tests of strains freshly isolated from the same infected quarters at intervals of one or two months showed no change in the characters of the strains.

It was found that the strains could be divided into two groups on the basis of their action on trehalose or salicin. The larger division (67 strains) fermented trehalose and included β-, α-, and non-haemolytic strains, some of which were positive on salicin and some negative. The smaller division (18 strains) did not ferment trehalose but all fermented salicin ; some were α- and some non-haemolytic. A table is given.

No difference was found in the reaction of the udder to infection with trehalose positive and trehalose negative strains respectively.

—A. W. STABLEFORTH.

STAMP, T. C. (1939). **Bacteriostatic Action of Sulphanilamide in vitro. Influence of Fractions Isolated from Haemolytic Streptococci.**—*Lancet.* **237.** 10–17. 2 figs., 7 tables. [9 refs.] [Author's summary copied *verbatim.*]

1. A fraction capable of antagonising the bacteriostatic action of sulphanilamide and M. & B. 693 in vitro has been isolated from a broth culture of a group C haemolytic streptococcus.

2. The fraction can be extracted from the bacterial cells by means of dilute NH_4OH but not with water or dilute HCl.

3. The fraction is active in low concentrations and is resistant to heat, dilute acids and alkalis. It appears to be non-specific in its action.

4. Preliminary chemical analysis indicates that the active fraction is free from protein and consists of a mixture of substances of relatively low molecular weight, including free amino-acids.

5. An apparently similar fraction has also been isolated from a culture of a group A haemolytic streptococcus.

6. Possible ways in which this substance may produce its antibacteriostatic effect are discussed.

KEOGH, E. V., & SIMMONS, R. T. (1940). **Cultural Methods as an Aid in Type Differentiation of Group A Haemolytic Streptococci.**—*J. Path. Bact.* **50.** 137–144. 2 tables. [13 refs.]

The authors examined the fermentation and cultural characters of a collection of streptococci which had already been classified by serological methods. The streptococci included type strains of Griffith's 26 types of *Str. pyogenes* or group A streptococci, and 246 strains isolated in Australia including several local types. They found that these streptococci can be classified by their reactions on starch, mannitol, and cellobiose, their colonial form (feathery or compact) in semi-solid serum-peptone-agar medium [see *V. B.* **9.** 516.], and by the production of opalescence in serum broth. The resulting classification was concordant with that obtained by slide agglutination but was less complete, only 12 groups being formed, some of which contained one type, others up to three or four and, in one case, ten.

It is not claimed that the methods used are a substitute for serological typing, but it is suggested that they may be of value as a preliminary presumptive test and in certain

cases may be sufficient for stating with reasonable assurance whether strains from principals and contacts are like or unlike and their probable type. The authors' experience has been, in some cases, that where the serological typing and the methods described have given conflicting results, the serological typing has eventually proved incorrect.—A. W. S.

McIlwain, H. (1939). **Pantothenic Acid and the Growth of *Streptococcus haemolyticus*.**—*Brit. J. exp. Path.* **20.** 330–333. [14 refs.]

Using the same procedure as that previously described [*V. B.* **10.** 157.], except that glutamine was added in a concentration of *M* : 2,000 and that hydrolysed casein replaced the bacto-peptone, it was demonstrated that pantothenic acid was necessary for the growth of the " Richards " strain of *Str. haemolyticus*. The effect on the growth of 0·004 μg. of pantothenic acid per ml. of media was apparent in 16½ hours and a concentration of 0·1 μg. per ml. was entirely adequate.—R. Allcroft.

Henry, M. (1938). **The Control of Tuberculosis in Dairy Herds.**—*Aust. vet. J.* **14.** 226-234. 3 appendixes.

This article describes in detail the methods used to ensure that milk supplied to Sydney and Newcastle comes only from cows which are negative reactors to tuberculin. The State Department maintains supervisory control of the scheme, but the testing is carried out by practitioners. The chief veterinary surgeon lays down the conditions under which the testing is to be done. The subcutaneous test is approved for general use, but the double intradermal test may be used by those veterinarians who have demonstrated their ability to carry it out satisfactorily. All cows tested are ear-tagged and given a serial number and a letter which represents the veterinarian who undertakes the test. The results of the test are reported to the Department. Reactors are branded and slaughtered under supervision. If there are no reactors, or if all reactors are found P.M. not to have lesions which would be likely to transmit the disease by contact, the herd is certified as tuberculosis-free. But if reactors are found which might have disseminated the disease, a further test is required for the herd. There is also provision for testing cows on farms supplying milch cows to the dairymen. Herds are retested every 12 months. All movements of cattle into or out of herds must be notified to the chief veterinary surgeon. Full details are given in the appendixes, and include directions for carrying out the tests. —W. I. B. Beveridge.

Ferauge, M. A. (1939). La lutte contre la tuberculose bovine, donne-t-elle des résultats ? **[Results of Bovine Tuberculosis Control in Belgium].**—*Ann. Méd. vét.* **84.** 407–412. 2 tables.

F. discusses the eradication of TB. and stresses the desirability of the formation of farmers into associations for that purpose. He provides figures to show that during tests carried out between 1936–38, and retests made in 1938–39, the reduction of the percentage of reacting cattle found in nine associations varied between 7 and 9.—J. R. Lawson.

Vandenbergh, C. (1940). Over tuberculosebestrijding. **[Control of Tuberculosis in Belgium].**—*Vlaam. Diergeneesk. Tijdschr.* **9.** 49–62. [English, French and German summaries].

V. discusses the regulations of 1892 and 1895 providing for tuberculin testing at the frontiers, clinical examinations at farms and abattoirs, and the slaughter of affected animals, with compensation for the owners. Under a voluntary scheme introduced in 1926, free tuberculin testing, inspection of premises and clinical examinations were provided for. Indemnities are paid for cattle condemned for slaughter. "Attested herd" certificates are issued to owners whose herds have been declared free from infection. To further the campaign, farmers and breeders are formed into associations, each under the supervision of a veterinary inspector. V. states that the results obtained by these measures are very satisfactory.

V. also stresses the importance of examination of the udder when making clinical examinations. He compares the values of the different tuberculin tests and states that the intradermal test is the most satisfactory [see also *V. B.* **10.** 490. and preceding abstract].—L. Tobback.

I. Rocker, G. (1937). **Tuberculosis in Animals.**—*J. Malaya Branch Brit. med. Ass.* **1.** 245–247. 2 tables.

II. Gilmour, C. C. B. (1937). **The Results of the Laboratory Examination of Animals in Singapore.**—*Ibid.* 247–251. 2 tables.

I. The part played in the dissemination of TB. by animal infection was discussed. The figures presented were compiled from examination during 1936 of cattle and swine from the abattoirs within the Singapore municipal area,

and are not, therefore, a true indication of the conditions in Malaya, but they do illustrate that the incidence of bovine infection is small, whereas there is a considerable incidence of this disease amongst pigs. A vast majority of the cattle came from Bali, but there was not a single case of infection amongst them, indicating that the incidence of infection amongst such imported animals may be regarded as practically negligible. In contrast to the figures relating to cattle, there was a considerable incidence of the disease amongst pigs from both home and foreign sources.

The following figures are given :– 28 cases of TB. were observed amongst 14,444 cattle and 1,183 cases among 250,000 pigs. The tuberculous cattle came from the Singapore area (11), Indochina (14) and China (3). In the pigs an infection rate of about 0·5% was noted in animals coming from Singapore, Indochina, and Bali. It is inferred that the pigs from Bali were infected with a type of TB. other than the bovine.

II. G. reports that acid-fast bacilli were seen in ten out of 315 smears from milk samples examined at the municipal laboratory at Singapore in 1932. Guinea pig inoculation gave negative results for TB. Since 1929, 124 of 418 specimens of organs from swine were found to contain acid-fast organisms, but in no case was TB. confirmed by g. pig inoculation. Human type TB. was, however, detected in one case of pulmonary TB. in a pig.

Tubercle bacilli were found in 46 specimens from selected bovine carcasses. Tables are given to show the results of examinations of small numbers of specimens from cattle and swine investigated from 1929–36, and other tables give the figures for [presumably macroscopic] diagnosis of TB. in oxen and buffaloes and pigs respectively, inspected in Singapore abattoirs from 1930–37.

G. states that " there can be no doubt that genuine tuberculosis of both human and bovine types occurs in pigs and cattle in Singapore ". [The evidence provided does not support this conclusion. Infection with avian type tubercle bacilli may have been responsible for lesions in pigs and some of them may have been infected by *Corynebacterium equi*—see *V. B.* **11.** 77].

MILLS, M. A., BARTH, E. E., & GUNN, F. D. (1940). **Experimental Pulmonary Tuberculosis in the Dog. Primary Infections.** —*Amer. Rev. Tuberc.* **42.** 28–57. 15 figs. [Numerous refs.]

A review is given of the literature dealing with the comparatively greater resistance to TB. of man and dogs than of certain experimental animals such as g. pigs and rabbits; these latter both differ greatly from the former two species in their susceptibility to the infection and in the nature of the morbid processes developing from such infection.

Observations were made on more than 150 dogs with various types of tuberculous lesions resulting from intrabronchial inoculations. These observations included experiments on primary TB. induced by different doses, reinfections, infections after attempts to immunize with BCG, and tuberculous infections complicated by intercurrent infections, particularly canine distemper. Two strains of tubercle bacilli were used; a human type strain (GII) and another strain formerly considered of bovine type but which had recently lost much of its virulence for rabbits. The effects of the intrabronchial insufflation of the bacilli are rendered more certain by suspending the bacilli in a viscous substance such as mucin, so that the inoculum is localized in a small area of the lung and evacuation of the material by coughing is prevented as far as possible [see also *V. B.* **10.** 410]. Comparison of the lesions resulting from administration of 1 mg. doses with those observed at various periods after injection of 4–10 mg. of the same strains of bacilli showed that the size of the initial dose is of great importance in determining the outcome of the experimentally induced disease. This relationship is much more clear in the highly resistant dog than in the highly susceptible g. pig or monkey. Doses of 1 mg. consistently produced lesions which were recognizable by X-ray examination but which rarely led to death of the animal; larger doses (3–10 mg.) produced fatal tuberculous lesions in about 80% of the dogs. The evidence indicates that with dogs, the concentration of the infecting bacilli in any one mass of tissue is of much more importance than the total dose received by the lung. From this it is concluded that the dose per dog is of more significance than the dose per kg. in experiments where the infecting dose is at first localized to a small mass of pulmonary parenchyma.

Determination of the sedimentation rates of red cells indicated that a rapid increase of sedimentation rate means a rapid extension of the tuberculous lesion in the lung or pleural effusion, frequently both. Details are given of

the technique used for bronchial inoculation and the lesions produced by the infection.—R. A.

HARINGTON, C., & EMMERSON, N. (1939). **A Case of Tuberculosis Caused by a Bacillus of Bovine Type in the Union of South Africa.**—*S. Afr. med. J.* **13.** 760–761. [1 ref.]

This is the first recorded case of TB. in a human being in South Africa due to the bovine type of the tubercle bacillus. The case occurred in a child of six who died with symptoms of emaciation, and blood and mucus in the faeces. The organism isolated was typically dysgonic and killed g. pigs and rabbits in about a month with marked generalized TB.—E. M. R.

YEGIAN, D. (1940). **Elimination of Virulent Tubercle Bacilli by the Normal Kidney of the Guinea Pig.**—*Amer. Rev. Tuberc.* **42.** 70–75. 1 fig., 3 tables. [10 refs.]

Of the supernatant portion of a suspension of young cultures of human tubercle bacilli, strain H 37, 2 c.c. were injected into the heart or right jugular vein of 21 healthy g. pigs which had given a negative reaction to an intracutaneous injection of old tuberculin a few days before the experiment. A specimen of urine was collected from each animal within 10–50 min. following the injection of the tubercle bacilli, but three animals were discarded from the experiment due to the presence of a few red blood cells in the urine of two, and staphylococci in the kidney of the third. Each specimen of urine from the remaining 18 g. pigs was injected intraperitoneally into a healthy g. pig which was killed eight weeks later; 16 of these presented generalized TB., and cultures from the lesions of these animals revealed organisms conforming in morphology and cultural characteristics to the tubercle bacillus, H 37. The experiment was repeated on 17 sensitized g. pigs of which ten eliminated tubercle bacilli in the urine within 8–50 min. following the intravenous injection of the bacilli. From these results it is concluded that the normal kidney of the g. pig can eliminate virulent tubercle bacilli and that sensitization of the tissues apparently does not influence the elimination of these organisms by the kidney.—R. A.

KYES, P., & POTTER, T. S. (1939). **The Resistance of Avian Tubercle Bacilli to Low Temperatures with Especial Reference to Multiple Changes in Temperature.**—*J. infect. Dis.* **64.** 123–134. [Numerous refs.]

The resistance of tubercle bacilli to very low temperatures (liquid air–192°C., liquid helium –270°C.) has long been known. The present paper not only confirms this but shows that the organisms (avian) can survive alternate rapid freezing in liquid air and subsequent thawing as often as 20–200 times. The bacilli were still viable although distinctly reduced in power to multiply in culture and to produce rapidly progressive disease in susceptible animals.

—H. H. GREEN.

POTTER, T. S. (1939). **Survival and Death of Tubercle Bacilli Subjected to Oxygen Restriction.**—*J. infect. Dis.* **64.** 261–268. [8 refs.]

Tubercle bacilli removed from culture media were subjected to abrupt extreme deprival of oxygen and moisture in highly evacuated tubes containing caesium azide as " oxygen getter ". Bacilli grown on glycerine agar were also subjected to controlled deprival of oxygen in sealed tubes. It was found that both avian and human strains may survive prolonged and drastic deprival of moisture and oxygen at 37°C., but are unable to survive a relatively mild oxygen restriction in the wet state when such restriction is combined with accumulation of the gaseous products of metabolism on glycerine agar.—H. H. GREEN.

BOISSEVAIN, C. H. (1940). **Growth Promotion of the Tubercle Bacillus by Serum Albumen.**—*Proc. Soc. exp. Biol., N.Y.* **44.** 110–112. 1 table. [6 refs.]

The addition of horse serum albumin, in concentration of 0·1 %, to either a glycine or an asparagine-ammonium citrate synthetic medium had a strong growth-promoting effect upon tubercle bacilli. Horse serum globulins, however, were either without effect or else inhibited growth.—ALFRED EDEN.

BUONOMINI, G. (1939). Recherches sur l'utilisation des hydrates de carbone par le B. tuberculeux. **[Utilization of Carbohydrates by the Tubercle Bacillus].**—*Boll. Sez. ital. Soc. int. Microbiol.* **11.** 91–96. 1 table. [13 refs.] [In French].

Attempts to grow various strains of human, bovine, and avian types of *Mycobacterium tuberculosis* on Sauton's medium deprived of glycerin and glucose, but with a variety of sugars and other carbohydrates as the source of carbon compounds were a failure, giving at best only a slight growth of the same order as with the original medium minus glycerol and

glucose. Repetition of this work with different strains of the human type, with a strain of a bovine type and carbohydrates in varying concentrations showed that certain of these strains were able to utilize lactose, galactose and potato starch to varying extents and B. considers the capacity of the organism to utilize various carbohydrates varies from strain to strain and that it is influenced by the concentration of these carbohydrates in the culture medium.—ALFRED EDEN.

DAVIES, R. (1939). **The Influence of Normal Blood and Certain of its Constituents on the Growth and Viability of the Tubercle Bacillus.**—*Tubercle, Lond.* **20.** May. Suppl. pp. 49. 4 figs., 15 tables. [Numerous refs.]

The growth of a virulent human type of tubercle bacillus on an egg-yolk saline medium was partially inhibited by 1 vol. %, and completely so by 5 vols. % or more of blood (Hb = 10 g. %). Growth was also completely inhibited by 0·1 % ferrous ammonium sulphate and partly at 0·035 and 0·07 % concentrations, whereas 5 vol. % of plasma had no significant effect on growth, nor had colloidal Fe $(OH)_3$ any effect in concentrations up to 0·028 %. Failure attended a study of the effect of whole blood, red blood corpuscles, and plasma on the multiplication of human H37 strain on a modified Long's medium containing agar, but subsequent viability tests demonstrated that the strain remained alive longer on this medium containing 5 or 10 % blood, or 1 % corpuscles than on the plain medium, or on this medium containing 1, 5 or 10 % plasma. Better growths were obtained when Long's ordinary medium was used, the extent of the growth after eight weeks being measured through the N content of the bacteria. Concentrations of whole blood of 1, 5 and 16·7 % very considerably inhibited growth, but the inhibition due to corpuscles, while extensive, was less than that due to whole blood. The plasma preparations although containing some Hb seemed to have an enhancing effect upon the growth, while the presence of whole blood or corpuscles permitted growth and development of the tubercle bacillus in the layers on the bottoms of the flasks. Further repetition of this work showed that the inhibitory effect of the r.b.c. was completely abolished by heating them at 100°C. for half an hour or at 120°C. for 20 min., and that the substance responsible for this inhibition can be located in the protein fraction of these cells and is separated out (with the protein) by saturation with $(NH_4)_2SO_4$. The heated r.b.c. had a slight beneficial effect on growth. During the incubation period the Hb in the medium appears to be partly converted into parahaematin and haemochromogen.

Suspensions of a virulent human strain in (a) distilled water, (b) Long's medium + 1·5 % sodium citrate, and (c) 0·9 % saline + 1·5 % sodium citrate failed to produce TB. in g. pigs after 1–4 days' incubation at 37°C., yet tubercle bacilli incubated with citrated human blood showed no diminution in their ability to produce TB. in g. pigs even after 14 days' incubation. It is suggested that the rapid death rate of the organism in saline and sodium citrate suspensions is due to a lack of available sources of energy in the suspension medium. There is some discussion about the nature of the inhibitory action of Hb in the medium and an explanation is advanced that it is due to some alteration in the oxidation-reduction potential of the medium, an explanation without any direct experimental support.—ALFRED EDEN.

HENLEY, R. R., & LE DUC, P. W. (1939). **Growth and Metabolism of Tubercle Bacilli.**—*Amer. Rev. Tuberc.* **40.** 313–335. 4 tables, 2 graphs. [13 refs.]

Studies are recorded on the metabolism of *Mycobacterium tuberculosis* grown in media containing varying proportions of glycerol and of nitrogen derived from various sources, chiefly aspargine, glycine, and the ammonium salts of glutamic, malic and malonic acids. With these five sources growth was good and the yield of bacteria was dependent upon, but not strictly proportional to, the amounts of glycerol and nitrogen present. Yields up to 2 g. dry weight of bacteria per 100 ml. of medium were obtained, and under favourable conditions 10 g. of bacteria were obtained for each gram of nitrogen, but in no case did the yield exceed 0·38 g. per gram of glycerol. Tuberculins of apparently equal potency were obtained, irrespective of the source of nitrogen.

The pH of the medium during growth was related to the proportion of glycerol and to the source and proportion of nitrogen, but not to the amount or rate of growth. The actual reaction at any time depends upon relative rates of production of alkali and acid, the former being derived from the nitrogenous compounds and the latter chiefly as an intermediary oxidation product of glycerol, itself subsequently further oxidized to carbon dioxide.

In the case of ammonium salts of acids not subsequently oxidized, such as ammonium sulphate, the ammonia is quite capable of serving as the sole source of nitrogen for the organism but growth is soon inhibited by unfavourable pH due to liberated acid. In media containing asparagine, glycine, ammonium malate, or ammonium glutamate at high levels the reaction became alkaline during the earlier stages of growth. In similar malonate media, cultures first became acid, pH values then rising as the glycerol supply was depleted, and the malonic acid itself then presumably oxidized with liberation of ammonia.

In media containing available nitrogen at high levels the glycerol supply was exhausted about the time the maximum bacterial weight was reached. At low nitrogen levels glycerol continued to disappear after the bacteria stopped increasing in weight, presumably by continued respiration of the still living organisms.—H. H. Green.

Darzins, E. (1939). Influence des caroténoïdes sur la croissance et l'acido-résistance des bacilles paratuberculeux de la fléole. **[Influence of Carotinoids on the Growth and Acid Resistance of the Timothy Grass Bacillus,** *Mycobacterium phlei***].**—*Ann. Inst. Pasteur.* **63.** 455–461. [10 refs.] [Translation of author's summary].

1. Carotinoid substances and crystalline carotene impede growth of *Mycobact. phlei.*

2. Bacilli grown in glycerin agar plus carotene are more acid-resistant than those grown without carotene.

3. Increase of the carotene content of the bacilli is followed by an increase in acid-resistance, while lowering of acid-resistance corresponds to a decrease in pigmentation.

4. This increase in acid-resistance is caused by raising the point of fusion of the fatty substances of the bacilli, which also confers greater resistance to heat and diluted alkalis.

5. Carotene is not indispensable to the growth of acid-fast bacilli.

Pande, P. G. (1940). **Paratuberculosis (Johne's Disease) of Cattle in Assam. I. Its Incidence and Epizootiology.**—*Indian J. vet. Sci.* **10.** 40–62. 11 tables. [11 refs.]

P. describes the topographical and climatic conditions of Assam. Poor acid soils supporting coarse grasses, and a heavy rainfall with resultant humidity, lower the vitality of cattle and encourage parasites. Diagnosis of Johne's disease was based on the double intradermal test with avian tuberculin, the bowel-washing method, and clinical observation. A description of the disease as it occurred on a number of farms is given. Its diagnosis was sometimes complicated by intestinal parasitism. Johne's disease is believed to have been introduced into Assam by an infected Sindhi bull purchased for a Government farm. It appears to have spread in the area described mainly by the movement of infected animals from two farms used for the distribution of breeding stock. Its rapid spread was facilitated by overcrowding of pastures, general climatic factors, concomitant diseases mainly helminthic, and mineral deficiency. The feeding of a mineral mixture rich in calcium increased the resistance of infected animals. The local cattle appear to be highly susceptible and the incidence among calves is high.—R. Fisher.

Graham, R., Boley, L. E., & Levine, N. D. (1939). **Studies on Bovine Paratuberculosis. I. A Note on the Efficacy of Chaulmoogra Oil in the Treatment of Bovine Paratuberculosis. II. The Effect of Chaulmoogra Oil and Related Substances upon the Growth of** *Mycobacterium avium in vitro.* **III. Experimental Treatment of Johne's Disease with Avian Tuberculin.**—*Cornell Vet.* **29.** 352–356, 357–359 and 359–362. 5 tables. [9 refs.] [Authors' summaries copied *verbatim*].

I. The results obtained in feeding chaulmoogra oil to 61 cows which reacted positively to the paratuberculosis test indicated that this treatment has no effect on the results of subsequent paratuberculosis tests as compared with a control group. No clinical manifestations of the disease were observed in reacting or non-reacting animals.

II. Chaulmoogra oil in a concentration of 1–100 apparently inhibited the growth of, but did not kill the *Mycobacterium avium in vitro.* In a concentration of 1–500 it inhibited growth in two of six flasks inoculated. In higher dilutions no apparent effect on the growth of *Mycobacterium avium* was noted.

2. The sodium salts of the total acids of *Hydnocarpus wightiana* in concentrations of from 1–100 to 1–1000 inhibited the growth of, but did not kill *Mycobacterium avium in vitro.* In higher dilutions no apparent effect on the growth of *Mycobacterium avium* was noted.

3. Sodium di-n-heptyl acetate in concentrations of from 1–100 to 1–1000 inhibited the growth of, but did not kill, *Mycobacterium avium in vitro*. In a concentration of 1–2000 the inhibitory effect was less marked, and in concentrations of 1–4000 and 1–8000 no appreciable effect was noted.

III. Seven cows affected with Johne's disease and one suspected of being infected as judged by their temperature reactions after the injection of avian tuberculin were treated by one, two, or three series of subcutaneous injections of avian tuberculin. This treatment had no appreciable effect on the results of subsequent tests, and by inference on the course of the disease.

REESE, H. W. (1938). Die Bekämpfung des Malleus in Mecklenburg-Strelitz. [**Control of Glanders in Mecklenburg-Strelitz**].—*Inaug. Diss., Berlin.* pp. 88. [Numerous refs.]

A painstaking review is given of :– (1) the literature back to the writings of Aristotle on the nature of glanders ; (2) the literature on the treatment of glanders, and (3) glanders and its control in Mecklenburg-Strelitz from about 1775.—J. E.

CRAIG, J. F., & RATTER, A. (1940). **The Epizootiology of Fowl Cholera.**—*Vet. J.* **96.** 296–301. [6 refs.]

Five outbreaks are described, four of which occurred during the months of September, October, and November. In two instances there was a previous history of fowl cholera and carriers were suspected. There is a tendency for the disease to die out, and when this occurs catarrhal symptoms become not uncommon, suggesting that carriers may harbour pasteurella in the nasal chambers. The most severe losses occur after changes in weather conditions. Geese are highly susceptible. Vaccination does not appear to prevent the presence of carriers and this suggests some need for legislative control of markets etc. The pasteurella isolated presented the usual morphological and cultural characteristics. The lesions are described.

—R. FISHER.

OLITZKI, L., & ELLENBOGEN, V. (1940). **A *Salmonella* Strain Isolated from Camels in Palestine.**—*J. comp. Path.* **53.** 75–79. 2 tables. [1 ref.]

From the ileum, kidneys, and heart of a camel which had been affected with enteric symptoms and cachexia, a salmonella strain was isolated which was antigenically similar to *S. kentucky*. The antigenic formula is as follows :– VIII, XX. : i, z_6. Further strains were recovered from the intestines of a camel showing similar symptoms and from one with cachexia ; this latter one was isolated by blood culture. The serum of healthy as well as infected camels contains agglutinins for the " H " and " O " antigens of *S. kentucky* as well as for other salmonella " O " antigens. This particular salmonella may be widespread as an infection of camels in Palestine, for of five camels with enteric symptoms and cachexia four were from Hebron and one from Gaza. The camel strains were of low pathogenicity for mice when fed by the mouth although latent infection of the experimental mice occurred. The isolated strains failed to attack glycerol and inositol, whereas the strain of *S. kentucky* did so.—R. LOVELL.

EDWARDS, P. R., & BRUNER, D. W. (1940). **The Occurrence of Multiple Types of Paratyphoid Bacilli in Infections of Fowls, with Special Reference to Two New Salmonella Species.**—*J. infect. Dis.* **66.** 218–221. 1 table. [6 refs.]

The authors describe 15 outbreaks of salmonella infection in poultry, mostly turkeys, in each of which two or more salmonella types were recognized. In addition, more than one type was found in cultures from the same bird. Two new serological types are reported and are designated as *S. saintpaul* and *S. litchfield* with antigenic formulae I, IV, V : eh : 1, 2, 3 and VI, VIII : l v : 1, 2, 3 respectively.

[With multiple salmonella infection in one outbreak, the difficulty of application of suitable control measures is increased ; this factor will have to be given consideration in future.]

—S. G. IYER.

EDWARDS, P. R. (1939). **Standard Strains of Salmonella.**—*Circ. Ky agric. Exp. Sta.* No. 50. pp. 4.

The International Salmonella Centre at Copenhagen was under the direction of MADSEN and KAUFFMANN and one of its functions was to supply standard strains and sera to the various national centres which were scattered over the world. The Department of Animal Pathology of the Kentucky Agricultural Experiment Station was designated as a national centre. The circular sent out points out that the centre is prepared to assist in supplying sera and strains to persons who are interested and

will also identify cultures of the genus *Salmonella*. A list is appended of 100 cultures with their index numbers and antigenic formulae.—R. LOVELL.

BURROWS, W. (1939). **The Nutritive Requirements of the Salmonellas. I. Tryptophane and the Growth of the Typhoid Bacillus.**—*J. infect. Dis.* **64.** 145–156. 4 figs., 2 tables. [15 refs.]

Early work suggested that from the nutritive point of view three varieties of *S. typhi* exist :- (a) those which can grow with ammonia as a sole source of nitrogen ; (b) those which require tryptophane but can be trained to grow without it, and (c) those which cannot be so trained.

In the present investigation eight strains of *S. typhi* were used and the results indicate that the function of tryptophane in the growth of those which require it is not that of supplying something essential for growth. It appears rather that it exerts a stimulating effect on growth, described as a kind of " trigger " action. It exerts a stimulating effect similar to sodium sulphate in glucose-ammonia solutions. Not only is tryptophane not " essential " in this sense, but it is actually synthesized by the bacteria during the growth process. This ability to synthesize tryptophane was shown by analysis of cultures before and after growth and there is a relatively delicate analytical method available for its determination. It appears therefore that nutritive requirements as usually determined may not be absolute, but rather depend on the nature of the basic solution. —R. LOVELL.

CHALLINOR, S. W., & RHODES, A. J. (1939). **The Value of the Sodium Dextro-Tartrate Fermentation Test in the Differentiation of *Salmonella* Organisms.** —*J. Hyg., Camb.* **39.** 651–657. 7 tables. [2 refs.]

The identification of salmonella cultures from cases of intestinal infection is important to the public health officer especially when it entails the differentiation between *S. paratyphi* B and the related food poisoning bacteria. Serological tests are often sufficient for such purposes, but when organisms are in the group phase it may be some time before a specific phase culture can be obtained. The authors have, therefore, re-investigated the fermentation of sodium *d*-tartrate and advocate its use for the purpose of a quick differential test. *S. paratyphi* B fails to ferment this salt, whereas *S. typhi-murium* and many other similar food poisoning salmonellas do ferment it.

The medium used contains pure peptone (1% bacto-peptone) and a 1% concentration of sodium *d*-tartrate. The pH is 7·4 and the tubes containing 5 c.c. are sterilized for 20 min. on each of three consecutive days. Tubes are inoculated from an agar slope and incubated at 37°C. for 24–48 hours. To determine whether decomposition of the salt has occurred, saturated lead acetate is added (0·6 c.c. per 5 c.c.). An uninoculated control tube shows a bulky, white, flocculent precipitate, whereas if fermentation has occurred a small amount only of a granular precipitate is formed.—R. L.

I. THOMSEN, A. (1940). Om Vaccination af Kalve mod smitsom Kastning. [**Vaccination of Calves against Bovine Brucellosis**].—*Beretn. 5. nord. Vet.-møde, Kbh., 1939.* pp. 263–277. 12 figs., 2 tables. [13 refs.] Discussion pp. 277–296. [French summary]. [Also appeared in *Maanedsskr. Dyrlaeg.* **51.** 353–363. (1939)].

II. MADSEN, T. (1939). Om Vaccination af Kalve med levende Kultur af B. abortus Bang. [**Vaccination of Calves with Live *Brucella* Culture**].—*Maanedsskr. Dyrlaeg.* **51.** 363–368. 3 tables. [1 ref.]

III. BENDIXEN, H. C. (1939). Om Reaktionsforhold i større Besaetninger, hvor Malkekøerne har vaeret underkastet Vakcination med levende Kultur af Brucella-Bakterier i Kviealderen. [**The Serological Reactions in Large Herds where Milch Cows have been Treated as Calves with Live Brucella Vaccine**].—*Beretn. 5. nord. Vet.-møde, Kbh., 1939.* pp. 277–289. 12 figs., 1 table. [Also appeared in *Medlemsbl. danske Dyrlaegeforen.* **22.** 531–539. (1939)].

IV. HINDERSSON, R. (1940). Användningen av levande kultur vid behandlingen av den smittosamma kastningen hös notkreatur. [**Vaccination against Bovine Brucellosis with Live Culture**].—*Ibid.* pp. 244–263. 5 tables. [7 refs.] [German summary].

I. After a review of the literature on calf vaccination, T. gives the preliminary results of trials on six large herds, all considerably infected, on two Danish islands. Calves were vaccinated once only, at 3–8 months of age with attenuated culture No. 19 obtained from America, " in a dose somewhat larger than that

used in America". About two thirds of the calves in each herd were vaccinated and the rest used as controls, all being naturally exposed to infection.

Results are given in a table and cover one calving period only. Of 328 vaccinated calves, 3·3% aborted, whilst 25% of 158 controls aborted.

At the discussion BENDIXEN spoke [see III]. OIEN described his experience in vaccinating free-living herds [details of vaccine not given] and WALL described some results with a strain of low virulence (the American Pitman-Moore strain) and with killed virulent cultures (Stockholm strain); he claims that both were capable of causing immunity and reducing calf losses, and advocates dead vaccine for use in uninfected herds: it causes a negative phase of long duration, and would be dangerous if the animals were exposed to infection at that time. With both vaccines W. is in favour of inoculating heifers and cows of any age, whether pregnant or not.

II. A description of work in a large herd in which calf vaccination was begun in 1932. The herd was divided into clean and infected sections and calves in the clean section were used for vaccination trials. The vaccine was a live virulent culture and each of 34 calves was given one dose of 10 c.c. subcutaneously when at the age of 2–15 months. Seven of these calves were infected between the 5th and 7th months of gestation by the conjunctival instillation of virulent culture, along with five controls. All controls aborted 1–2 months before full term; four test heifers calved at full term, one calved one week, one two weeks, and one two months prematurely. *Br. abortus* was isolated from the placenta of all seven of these heifers. The conclusion from this experiment was that the vaccination conferred a relative immunity.

After 1932 all heifer calves in the above herd were vaccinated when 6–14 months old. Up to 1939, 87 calves had been vaccinated, of which 82 had calved normally and had a negative blood agglutination reaction at parturition; four calved normally but had high blood agglutination titres and infected placentas, and one aborted at seven months and showed a high blood titre and an infected placenta.

During the same period an attempt was made to clean the infected section of the above herd by hygienic measures combined with vaccination of all heifer calves at the age of 15–30 months by means of two doses of virulent *Br. abortus* given at 14 days' interval. During the first year there were 16 abortions and 54 normal calvings. Milk tests for the presence of *Br. abortus* were carried out systematically, and as long as any excretors were present all the vaccinated animals were given an annual dose of killed culture. This continued until 1937 when the last excretor was under observation. The last abortion occurred in 1936 and since 1937 the herd has remained free from infection.

III. Systematic blood tests were made on 2,881 cows and on 1,150 heifers in 24 large herds, which are grouped for convenience into A-herds in which all the female breeding stock had been vaccinated as calves, B-herds, containing some cows vaccinated as calves and some not so treated, and C-herds where no vaccination had been carried out.

A Danish strain of *Br. abortus* about equal in virulence to the American strain 19 was used on the calves below the age of 12 months. In group A the percentage of reactors was 26, in group B vaccinated cows 27, in group B non-vaccinated cows 45, and in group C 44. Complete agglutination at a titre of 1 : 10 was taken as the positive point. Figures are also given to show the numbers of cows which reacted at various titres between 1 : 10 and 1 : 100. [It is not stated when the tests were performed.]

Similar figures are also given for two herds, one of which had been vaccinated for many years and the other not vaccinated. In the first herd 23% of the cows and 68% of the heifers were reactors and in the second herd 46% of the cows and 40% of the heifers. *Br. abortus* was not detected in the milk of any of 21 one-calf cows in the first herd but was isolated from the milk of 12 one-calf cows in the other herd.

These results are held to prove the high value of calfhood vaccination with an attenuated strain. A further observation made is that 80% of cows with a blood agglutination titre of 1 : 200 were excreting *Br. abortus* in their milk. Such cows ought therefore to be removed from herds as part of the control measures.

IV. After a brief review of various methods of controlling bovine brucellosis, H. describes some vaccination trials in Finland, using an American strain of low virulence, designated P.M. [Pitman Moore?].

Seventy-one heifers, all negative reactors in five infected herds, were vaccinated at an unstated age, mostly 2–3 months, but a few at

7 months, before service. All calved normally and all but six reacted negatively at calving time. Three reactors (titre 1 : 100) all excreted *Br. abortus* in their milk, the infection being held to have resulted naturally and not from the vaccine. Three other reactors (titre 1 : 50) gave milk free from infection.—J. E.

Dustin, C. C., & Weyler, H. L. C. (1940). **The Incidence of Chronic Undulant Fever in Rhode Island.**—*New Engl. J. Med.* **222.** 670–673. [18 refs.]

The authors suggest that chronic human brucellosis is prevalent in southern New England, in a form not generally recognized. They doubt the current belief that infection of human beings is almost entirely due to raw milk and suggest that contamination through other food products is of equal importance.

Barnetson, J. (1939). **Undulant Fever: Its Incidence in South Africa.**—*S. Afr. med. J.* **13.** 230–233. 2 tables, 1 graph, 1 map. [18 refs.]

Three reactors to the agglutination test for brucella infection were encountered among employees of Johannesburg abattoirs. Of 1,900 sera from different parts of South Africa examined at the South African Institute for Medical Research, 5·7 % gave positive reactions. The preponderance of reactions in sera from South West Africa, 24·9 %, is noteworthy and it is suggested that this may be associated with brucella infection in Karakul sheep.—E. M. R.

Koopmansch. (1939). La vaccination des chevaux de l'armée par l'anatoxine tétanique. **[Vaccination of Army Horses with Tetanus Anatoxin].**—*Ann. Méd. vét.* **84.** 369–374. [5 refs.]

K. describes in detail the method of immunizing horses against tetanus by the use of anatoxin. Tapioca powder, added to the anatoxin in the proportion of 1 g. per 100 c.c. antigen, by setting up a local inflammation at the point of inoculation, favours the gradual absorption of the anatoxin and so appears to assist in producing an extremely solid immunity. Three injections are given, the first two with an interval of one month between and the third a year later. This method was introduced for the Belgian army and police horses in 1935 and, while no case of the disease occurred in 6,571 vaccinated horses, there were nine cases in an unstated number of non-vaccinated animals. The immunity produced by the method is so solid that hyperimmunity can be quickly achieved for the production of tetanus antiserum.—J. R. Lawson.

Gordon, W. S., Stewart, J., Holman, H. H., & Taylor, A. W. (1940). **Blood Changes and Post Mortem Findings Following Intravenous Inoculation of Sheep with Culture Filtrates of *Cl. welchii*, Types A, C, and D.**—*J. Path. Bact.* **50.** 251–269. 9 figs., 2 tables. [Numerous refs.]

The authors describe and compare the symptoms, changes in the chemical and physical properties of the blood, and P.M. findings following the intravenous inoculation of sheep with culture filtrates of *Clostridium welchii* of Types A, C, and D. Details of the technique used in the various examinations are given and the changes following the inoculation of each type of toxin are shown in the form of graphs. Altogether 11 sheep were inoculated intravenously with Type A, six with Type C and nine with Type D toxins. Dyspnoea and inco-ordination of gait were common to the syndrome produced by all three types and no marked differences were seen. P.M. examination of animals which died included the histological examination of the liver, kidneys, lungs, and heart wall; common features were haemorrhages in various parts of the body and necrobiotic and degenerative changes in these organs. The sheep killed by Type A toxin showed a marked oedematous condition of the lungs and a high degree of nephrosis—changes not found in the sheep inoculated with Types C or D. Animals inoculated with Type D showed distinct congestion of the sinusoids of the liver, this being absent in the sheep which had received Types A and C. It was found that while no characteristic blood pictures followed injection of Type C toxin, Type A produced a marked haemolytic anaemia, and Type D a typical anhydraemia.—J. R. Lawson.

Taylor, A. W. (1940). **Antigenic Variation in a Strain of *Cl. welchii*, Type C. (*B. paludis*).**—*J. comp. Path.* **53.** 50–54. 2 tables. [8 refs.]

A culture of *Clostridium welchii*, isolated in 1930, was shown in 1933 to be possessed of its original toxicity. At this period the m.l.d. of culture fluid for mice was approximately 0·0001 c.c., and 0·00025 c.c. was neutralized only by *Cl. paludis* [*Cl. welchii* Type C] antitoxin. In 1937 toxin-antitoxin tests showed that the strain had lost much, although not quite all, of its power to produce Type C toxin.

Seven strains were obtained from different sources and toxin-antitoxin tests again carried out, with the same results as before. The prolonged cultivation on artificial media had changed the original Type C strain to one which belonged, antigenically, to Type A. An attempt to increase the toxicity of the strain by animal passage gave negative results.—J. R. Lawson.

Taylor, A. W., & Gordon, W. S. (1940). **A Survey of the Types of *Cl. welchii* Present in Soil and in the Intestinal Contents of Animals and Man.**—*J. Path. Bact.* **50.** 271–277. 3 tables. [10 refs.]

The authors record the isolation and typing of 1,343 cultures of *Clostridium welchii* obtained from soil and the intestinal contents of animals and man. From 43 samples of soil, obtained mainly from farms in northern Scotland, 196 strains of the organism were isolated, 7 being of Type D and the remainder of Type A. 174 samples of the intestinal contents of various species of animals and of man were examined and 1,147 strains of *Cl. welchii* isolated. Of these 1,134 were of Type A, 3 of Type B and 10 of Type D. These intestinal samples were also tested for the presence of toxins by intravenous inoculation of mice with filtrates through paper pulp. Only one (later identified as belonging to Type D) from a rabbit was lethal for mice in a dose of 0·5 c.c. The authors refer to the finding of this toxin and suggest that enterotoxaemia may be a cause of acute illness with fatal outcome in rabbits. They also point out the possibility of rabbits being a factor in the dissemination of lamb dysentery since during their survey, *Cl. welchii* Type B was obtained from the intestinal contents of a wild rabbit.—J. R. Lawson.

Dayus, C. V. (1938). **Vaccination of Pregnant Ewes Against Infectious Enterotoxaemia as a Means of Preventing "Pulpy Kidney" in Their Lambs.**—*Aust. vet. J.* **14.** 251–255. 5 tables. [2 refs.]

Many lambs die from enterotoxaemia before it is possible to protect them by active immunization. It has been demonstrated that this early mortality can be largely prevented by the use of antiserum, but this presents practical and economic difficulties. Attention was therefore given to vaccination of the ewe prior to lambing and extensive field trials have now been undertaken. In the first trials only 0·24% of lambs from 812 vaccinated ewes died, compared with 7·02% of lambs from 840 control ewes. Subsequent trials confirmed the value of the method although they did not show such a high degree of protection.

Two reasonably large doses (5 ml. and 10 ml.) of vaccine were considered necessary and were given with at least a month's interval between doses. The protection was apparently afforded until as late as the sixth week of age. The method is now being used fairly extensively by farmers.—W. I. B. Beveridge.

Edgar, G. (1938). **Some Considerations of the Predisposing Causes and Methods of Control of Entero-Toxaemia.**—*Aust. vet. J.* **14.** 234–240. [16 refs.]

E. discusses factors rendering sheep susceptible to enterotoxaemia. Toxic filtrates of Types of B, C, and D of *Clostridium welchii* have been demonstrated from ingesta of small intestines of sheep in many countries, but in Australia Type D prevails almost exclusively. Strangely enough, the publication of Bennett's original work on the disease coincided with a widespread serious outbreak such as had not been seen before or since. The conditions prevailing at the time were fat condition of the sheep and luscious pasture. Although mortality from enterotoxaemia is more common under these circumstances, nevertheless the disease may occur in animals in poor condition on a low plane of nutrition.

The causative organism, *Cl. welchii* Type D, is no doubt widespread in soil and the main question is what enables it to produce fatal amounts of toxin in the bowel. E. agrees with Bennett that bowel stasis is probably an important factor, although experiments designed to demonstrate this are seldom successful. He was unable to find any evidence in support of a suggestion that altered pH of the bowel contents may play a part. He regards enterotoxaemia not as a primary condition but as a sequel to some physiological or metabolic dysfunction. He has found that sheep with other afflictions may develop enterotoxaemia as a terminal condition.

In discussing control measures E. points out that, since active or passive immunization gives protection, the bowel toxin must be liberated relatively slowly.—W. I. B. Beveridge.

Schoop, G. (1939). Botulismus bei Füchsen ? [**Botulism in Foxes**].—*Dtsch. Pelztierz.* **14.** 431–433. 2 figs. [3 refs.]

A semi-popular account, written for the benefit of fox-breeders, of an earlier article by the same author [see *V. B.* **10.** 82]. No further information is given.—H. E. Harboru.

VINCENT, Hyacinthe. (1939). Sur les caractéristiques pathogènes des microbes de la gangrène gazeuse. Principes fondementaux de la sérothérapie antigangreneuse. **[Pathogenic Characteristics of Gas Gangrene Bacilli. The Principles of Serotherapy].**—*C. R. Acad. Sci., Paris.* **208.** 689–693. [4 refs.]

Experiments with 34 control and 77 test g. pigs demonstrated the superiority of a plurivalent, antibacterial, antitoxic, gas gangrene antiserum over a plurivalent antitoxic serum as a protection against a severe experimental infection with *Clostridium welchii*. Results have been confirmed in the treatment of gas gangrene in man.—R. O. MUIR.

GORDON, J., & MCLEOD, J. W. (1940). **A Simple and Rapid Method of Distinguishing *Cl. novyi* (*B. oedematiens*) from other Bacteria Associated with Gas Gangrene.**—*J. Path. Bact.* **50.** 167–168. 4 figs. on 1 plate. [4 refs.]

The authors observe that colonies of *Clostridium novyi* are capable of producing a green halo on chocolate agar medium and blackening on benzidine blood agar, the composition and method of preparation of which are given. The method provides for the rapid identification and isolation of *Cl. novyi* as the colonies are picked out at a glance because of their characteristic black appearance. This feature is excellently illustrated by photographs. To ensure that it was not peculiar to one particular strain, 11 strains of *Cl. novyi* were grown on the described medium and all produced the typical blackening while cultures of *Cl. welchii*, *Cl. septique*, *Cl. tetani*, *Cl. sporogenes*, *Cl. histolyticus*, and a bacillus of the type of *Cl. tertium* gave negative results.—J. R. LAWSON.

ELBERG, S. S., & MEYER, K. F. (1939). **The Nutritional Requirements of Clostridium parabotulinum, A.**—*J. Bact.* **37.** 429–445. 5 tables. [Numerous refs.] [Authors' summary copied *verbatim*].

1. Previous reports concerning the essential nature of certain acidic fractions from yeast and pregnancy urines in the growth of *Clostridium parabotulinum* have been confirmed.

2. Growth of *Clostridium parabotulinum* in media composed of amino acids has been obtained.

3. Although the nutritional requirements of *Clostridium parabotulinum* resemble those of *Clostridium sporogenes* in the group of amino acids required for growth, there are qualitative differences in their needs which have not yet been solved to the point of obtaining massive growth in synthetic media.

HADLEY, P. (1939). **Bearing of Dissociative Variation on the Species-Concept among the Schizomycetes.**—*J. infect. Dis.* **65.** 267–272. [Author's summary copied *verbatim*].

This paper points out why the present taxonomic basis for species characterization and classification among the bacteria is inadequate and misleading. Through utilization of the facts of dissociative variation an attempt is here made to clarify our views regarding the real nature of the bacterial individual and of the bacterial species. It is further indicated that the acceptance of such a new viewpoint by bacteriologists would have several important advantages for bacteriology. Chief among these would be the possibility of obtaining a complete and accurate description of the bacterial species microphyte, represented by the summation of its developmental stages.

KIRCHHEINER, E. (1939). Étude biochimique comparée de *Spherophorus necrophorus* et *Spherophorus funduliformis*. **[Comparative Biochemical Study of *S. necrophorus* and *S. funduliformis*].**—*C. R. Soc. Biol. Paris.* **132.** 885–887. [4 refs.]

Following PRÉVOT's classification [*V. B.* **10.** 164.] K. studied the differentiation of "*S. necrophorus*" [*Fusiformis necrophorus*] and "*S. funduliformis*", using fermentation reactions and estimation of the nitrogen metabolism, and states that they are distinct species.

EMMONS, C. W. (1938). **The Isolation of *Actinomyces bovis* from Tonsillar Granules.**—*Publ. Hlth Rep., Wash.* **53.** 1967–1975. 4 figs. on 1 plate. [Numerous refs.] [Author's summary copied *verbatim*].

In an unselected series of 200 pairs of tonsils [human] from routine tonsillectomies a microaerophilic species of *Actinomyces*, not distinguishable from *A. bovis*, was observed in 37 percent of the pairs; it was obtained in culture from 11 percent. None of the patients had antinomycosis.

These tonsillar strains, like those from clinical actinomycosis, are avirulent for guinea pigs. Repeated inoculations of the same animal, however, increased the severity and duration of lesions produced.

Sensitization to homologous and heterologous strains and to old tuberculin could not be demonstrated in experimental guinea pigs.

It seems probable that *Actinomyces bovis* is commonly present in the normal mouth and throat, and becomes pathogenic only under extraordinary conditions. The tonsillar crypts serve as an important reservoir for the saprophytic phase of this pathogenic fungus.

Welsch, M. (1939). De l'activation du principe bactériolytique des actinomyces par les rayons ultra-violets. **[The Inactivation of a Bacteriolytic Principle of Actinomyces by Ultra-Violet Rays]**. —*C. R. Soc. Biol. Paris.* **131.** 1296–1299. 1 fig. [6 refs.]

The bacteriolytic principle of *Actinomyces*, like that of certain viruses, 'phages, enzymes, and toxins, proved sensitive to ultra-violet light of short wave-length but much less so than to heat, due to the high absorptive power of its colloids for ultra-violet rays.—R. O. Muir.

Orlov, F. M. (1940). O roste nekotorykh dermatomitsetov na prostykh substratakh. **[The Growth of Certain Dermatomycetes on Different Substrates]**.—*Sovyet. Vet.* No. 4. pp. 40–41.

Emulsions of *Microsporon equi*, *Trichophyton equi* and *T. gypseum asteroides* were sown on or in 16 substrates :– horsehair, cloth, leather, hay, oats, straw, horse dung, wood, sawdust, earth, clay, sand, brick dust, tap water, distilled water, and physiological saline. On the 20th day growth was observed with all substrates, that on hair, cloth, leather, oats, hay, straw, and horse dung being much more extensive than on the others.

Reference is made to previous data given by O. regarding the long viability of these fungi in stables, and the conclusion is drawn that stables and all objects which come into contact with affected horses must be carefully and repeatedly disinfected, as outbreaks may occur even after several years if such precautions are neglected.—E. Martin.

Palmeiro, J. M. (1938). Contribuçăo ao estudo cultural e experimental das tinhas e identificaçăo de algumas das existentes em Portugal. **[Cultural and Experimental Study of Ringworm in Portugal]**.—*Repos. Lab. Pat. vet., Lisboa.* **4.** 231–258. 3 figs. on 2 plates. [English and French summaries].

P. gives a long description of the morphology, reproduction, and pathogenicity of fungi in general and of ringworm fungi in particular. He cultivated the following genera found in Portugal :– *Achorion* including *A. schoenleini* and *A. quinckeanum*; *Microsporon*, including *M. audouini* and *M. felineum*; *Trichophyton*, including *T. equinum* and *T. caninum*. The seed material was obtained from horses, mules, cattle, dogs, cats, rabbits, and mice.—M. W.

Krembs, J. (1937). Seltene Schimmelpilzerkrankung bei eimem Rehkiss. **[Unusual Fungoid Infection in a Roe Deer Calf]**.—*Dtsch. Jager.* No. 44. 1 fig. [Abst. from reprint, p. 1].

K. describes the lesions found in the upper part of the respiratory tract in a case of fungoid infection in a roe deer calf. The head only was available for examination, and this had been formalinized so that cultural examination was not possible. A yellowish white and somewhat friable mass completely filled the upper part of the nasal sinuses and the whole of the frontal sinuses, and had destroyed the anterior part of the brain. Branching filaments of a fungus could easily be demonstrated on histological examination.—H. E. Harbour.

Palmeiro, J. M. (1938). Da freqüência e patogeneidade da Mycotorula Albicans em pintos e perus. **[Frequency and Pathogenicity of *Mycotorula albicans* in Chickens and Turkeys]**.—*Repos. Lab. Pat. vet., Lisboa.* **3.** 235–239. 2 figs. [4 refs.] [English and French summaries].

P. reports the isolation of *M.* (= *Syringospora*) *albicans* from the alimentary tract of a large number of chickens and young turkeys, which were destroyed during the investigation of an epizootic disease.

On P.M. examination there were diphtheritic pseudo-membranes of a white colour and caseous consistency in the intestine and, in some cases, ulcers in the proventriculus and intestine.

M. albicans is normally present in the intestinal tract of fowls and P. considers the organism to be pathogenic only under such conditions as malnutrition, damp housing, wet pastures, and rapid changes of temperature.—M. W.

Palmeiro, J. M. (1938). Subsídios para o estudo cultural e experimental do agênte da linfangite epizoótica. **[Cultural and Experimental Study of *Cryptococcus***

farciminosus].—*Repos. Lab. Pat. vet., Lisboa.* **4.** 203–230. 10 figs. on 4 plates. [English and French summaries].

Much of the paper is devoted to the literature on the subject.

P. used antiformin in isolating the organism using chicken broth and veal broth for primary cultures. Satisfactory growth was established in 24 hours in the chicken broth medium and in 48 hours in the veal broth. Horse-dung agar proved unsatisfactory. Cultures retained their vitality after a year. Viability tests were carried out with physical and chemical agents. No exotoxin was present in cultures, but an endotoxin was obtained by maceration.—M. W.

DE MONBREUN, W. A., & ANDERSON, K. (1939). **The Dog as a Natural Host for *Histoplasma capsulatum*. Report of a Case of Histoplasmosis in this Animal.**—*Amer. J. trop. Med.* **19.** 565–588. 8 figs. on 3 plates. [20 refs.] [Authors' summary copied *verbatim*].

1. A generalized infection in a dog by a fungus proven to be identical with *Histoplasma capsulatum* of Darling in all of its phases in both the tissues of its host, and in cultures is reported. 2. The fungus was cultivated and found to fulfil all of Koch's postulates. 3. This is the first report of Histoplasmosis occurring in any natural host other than man. 4. The disease was also transmitted to dogs and puppies by feeding them cultures of the fungus. 5. The infected dog might possibly transmit the infectious agent to man in infected excreta and secretions, or it might be possible that the flea or the tick acts as a transmitting agent. 6. Histoplasmosis is probably more common than is indicated by the medical literature. 7. In obscure cases of splenomegaly and lymphadenopathy, *Histoplasma capsulatum* should be searched for in blood films, biopsies of lymph nodes, and in cultures of blood and lymph nodes.

REYER, W. (1939). Infektionsversuche mit Blastozystis. **[Experimental Infection with Blastocystis].**—*Zbl. Bakt. I. (Orig.).* **144.** 421–425. [5 refs.] [Translation of author's summary].

1. Infection tests on dogs, rats and white mice were made with *Blastocystis* strains from rats and human beings.

2. The blastocystis organisms quickly lose their morphological characters along with their invasiveness in culture.

3. Human blastocystis organisms are not transmissible to dogs and rats, nor are rat strains transmissible to mice.

4. In rats infected with rat *Blastocystis*, the parasite does not appear in the faeces until the third day.

DISEASES CAUSED BY PROTOZOAN PARASITES

DOMILESCU, G. C. (1938). Contributiuni la studiul transmisiunei experimentale a durinei Europene—tulpina românească. **[Experimental Dourine in Laboratory Animals].**—*Thesis, Bucarest.* pp. 78. [Numerous refs.] [French and German summaries]. [Translation of author's French summary].

1. The European strain of *Trypanosoma equiperdum*, isolated in Roumania, is transmissible to horses and laboratory animals. 2. The best method of transmission in laboratory animals is by intratesticular injection (Ciuca's method). 3. Rabbits are most sensitive and rats and dogs least sensitive to infection. 4. Removal of the spleen did not increase the susceptibility of rats and mice to infection. 5. The best method for obtaining transmission was by blockading the reticulo-endothelial system with 5% disodium phosphate + 5% calcium chloride in proportions varying for each species. This was found to be superior to blockading with indian ink. 6. The development of leucopenia in laboratory animals after exposure to X-rays has the same effect as functional paralysis of the reticulo-endothelial system produced by chemical substances or by splenectomy. 7. For serial transmission of this strain of *T. equiperdum*, inoculation should be accompanied by methods of paralysing the natural resistance of the animal (splenectomy, X-rays, chemical substances). 8. The strain is now in its third passage in rabbits and second in dogs and rats.

OAG, R. K. (1940). **Attempts to Cultivate Trypanosomes in the Developing Egg.**—*J. Path. Bact.* **51.** 137. [Copied *verbatim*].

Thirty-five chick embryos, varying in age from 8 to 12 days, were inoculated with blood from a mouse heavily infected with *Trypanosoma brucei*. Of these, seven showed living trypanosomes when examined after 3–4 days' incubation, and blood from these was inoculated into thirty-one other embryos at a similar stage

of development; no trypanosomes, living or dead, could be demonstrated in any of these thirty-one embryos, either by direct dark-ground examination or by inoculation of mice. Similarly nine 19-day embryos were inoculated with heavily infected mouse blood and allowed to hatch, but none of the resulting chicks showed trypanosomes in its blood by either method of examination.

Eight chick embryos were inoculated with *T. congolense* and eight with *T. equiperdum*, but in no case could the protozoa be demonstrated after incubation.

It thus appears that the developing chick embryo is unable to support the growth of trypanosomes, and the seven positive results obtained with *T. brucei* must be regarded as due to a simple survival of the protozoa during the 3 or 4 days' incubation, as the infection could not be transferred.

LAPAGE, G. (1940). **The Study of Coccidiosis (Eimeria caviae [Sheather 1924]) in the Guinea Pig. Part I & Part II.**—*Vet. J.* **96.** 144–154; 190–202; 242–254, and 280–295. 36 figs. on 3 plates. [Numerous refs.]

L. confirms the view that the incidence of *E. caviae* in g. pigs is very high. Repeated daily examinations for oocysts must be carried out before an animal may be regarded as negative. The oocysts sporulated in 9–11 days when mixed with a variety of fluids at 18–22°C., whether aerated or not.

The organisms were found in the colon only, infestation being most severe in the first 3–6 in., although in heavy infestations the whole of the colon may be affected. There is often astonishingly little change in the tissues of the colon even when numerous coccidia are present, and the mortality rate does not resemble that from coccidiosis in chickens.

The appearance of the nucleus at various stages in the life-cycle is described. It has one large karyosome and does not contain any chromatin rods, or granules resembling chromosomes, in the extrakaryosomatic area. Nuclear division resembles that of many other coccidia. L. stresses the importance of recognizing the different appearances shown by the nucleus when stained by various methods.

—M. L. BINGHAM.

ANON. (1939). **Notes on Animal Diseases. I. Redwater and Anaplasmosis. II. East Coast Fever and Related Diseases. III. Piroplasmosis and Anaplasmosis of Animals other than Cattle and Trypanosomiasis.**—*E. Afr. agric. J.* **4.** 297–303, 381–385 and 463–468.

A general account of the above infections as they occur in East Africa.

GALLI-VALERIO, B. (1939). Sur une toxoplasmiase du *Melopsittacus undulatus* Shaw. **[Toxoplasmosis in Parrots (*Melopsittacus undulatus*)].** — *Schweiz. Arch. Tierheilk.* **81.** 458–460. [In French].

G. found a species of *Toxoplasma* in smears of peritoneal exudate of mice, inoculated with liver emulsion from two dead blue parrots sent in for diagnosis. Although toxoplasms have not been recorded from *M. undulatus*, G. considers that the organisms were present in the birds rather than that the inoculum provoked any action on pre-existing toxoplasms in the mice.—M. L. BINGHAM.

ANGULO, L. N. (1935). Les corps de Foa-Kurloff (" Lymphocytozoon Rossi " Nájera) et leur evolution chez le cobaye. **[Kurloff Bodies (*L. rossi*, Nájera) and Their Development in Guinea Pigs].**—*XIIe Congr. int. Zool. Lisbonne, 1935.* **3.** 1969–1987. 1 text-fig., 40 figs. on 2 plates, 1 table. [Numerous refs.] [In French].

The nature of Kurloff bodies is discussed, A. favouring the theory that they are parasitic. He points out that they occur in the cytoplasm of typical lymphocytes, but that the cytoplasm of these cells is hypertrophied as the result of the parasitic invasion. The bodies are described as occurring in ten different forms (described as haematoblastic, rosette, condensation, prenuclear, prenuclear rings, nuclear, prevacuolar, vacuolar, and free). [No definite evidence of the parasitic nature of the bodies is produced].

—U. F. RICHARDSON.

FLORENTIN, P., & BINDER, C. (1940). Production expérimentale de leucocytes à corps de Kurloff chez le cobaye. **[Experimental Production in G. Pigs of Leucocytes Containing Kurloff Bodies].** —*C. R. Soc. Biol. Paris.* **133.** 127–130. [3 refs.]

Hyaline azurophile inclusions (Kurloff bodies) are normally found within the cytoplasm of a proportion of mononuclear leucocytes in the blood of g. pigs and some other mammals. They are most frequent in the

blood of adult and aged g. pigs. Their nature is not known, but it has been suggested by some workers that they represent parasitic forms and they have even been named "*Rickettsia kurlovi*". F. has been able to produce large numbers of these inclusions within mononuclear cells in the blood and haemopoietic tissues of g. pigs by the injection of folliculin, testosterone, progesterone, and vitamin D in the form of ergosterol. The injection of albumen, heterologous serum, adrenalin, pitruitrin, insulin, and thyroxin failed to cause their appearance and it is suggested that the phenanthrene nucleus is the active agent in causing their formation. F. considers that Kurloff bodies are degenerative structures produced in leucocytes due to the action of endogenous toxic substances formed in older animals coincident with aplasia of the lymphoid tissues.

—E. G. White.

DISEASES CAUSED BY VIRUSES

I. Flückiger, G. (1939). Zum Artikel von Dr. E. Gräub: "Die Maul- und Klauenseuche vom epidemiologischen Standpunkt aus betrachtet". [**Comment on Gräub's Article "Epidemiology of Foot and Mouth Disease".**—*Schweiz. Arch. Tierheilk.* **80.** 524. (1938)].—*Schweiz. Arch. Tierheilk.* **81.** 242–258. 2 charts. [12 refs.]

II. Frei, W. (1939). Ueber die Ursachen der Unfälle bei den Maul- und Klauenseuche-Impfungen mit Kristallviolettblutvakzine. [**Causes of Accidents in Inoculation for Foot and Mouth Disease with Crystal - Violet Vaccine**]. — *Ibid.* 390–401.

III. Gräub, E., Zschokke, W., & Saxer, E. (1939). Die experimentellen Grundlagen der Schutzimpfungen gegen die Maul- und Klauenseuche mit Kristallviolett - Vakzine. [**Experimental Grounds for Protective Vaccination against Foot and Mouth Disease by Crystal-Violet Vaccine**].—*Ibid.* 436–456. 2 tables. [8 refs.]

I. F. considers Gräub's conclusions [*V. B.* **9.** 767.] on the usefulness of crystal-violet vaccine unjustified by the experimental work on which they were based, and publishes protocols of some of Gräub's initial work (done with F.'s assistance) in support of his opinion.

The remainder of the paper consists of a discussion of the control of the disease, in which no new information is given. F. considers that the failure of Gräub's vaccine to confer a solid immunity, capable of withstanding prolonged exposure to a highly infective animal in close proximity, condemns the vaccine as an agent for use in the field.

II. In the course of field inoculation, 51 animals (20 cows, 4 steers, 9 calves, 17 pigs and 1 sheep) on a farm received vaccine against F. & M. disease. Five were given formol vaccine and the remainder crystal-violet blood vaccine, which for 31 cases was apparently prepared in Gräub's laboratory at Berne. Detailed results are not given, but it is stated that 13 of the bovines died or had to be killed up to the 21st day after inoculation.

Three factors possibly related to these unsatisfactory results are discussed:– (1) It is unlikely that blood group factors were responsible, since the blood was injected extravascularly, and, in any case, isolysin was found only in 5% of cases examined. (2) Breakdown products in the injected blood may be suggested as responsible, but F. doubts their importance. (3) The P.M. findings suggested to F. the possibility of bacterial contamination of the vaccine. Anaerobes were found at the site of injection in three out of 52 g. pigs injected with 1 c.c. of the vaccine. The bacteriostatic action of crystal-violet in the concentration as used in the vaccine [see III] was tested both by cultural and animal tests. In culture staphylococci were killed in 40 min., brucella in 24 hours, while *Bacterium coli* and anaerobes were not affected. Inoculation of g. pigs with vaccine contaminated with *Clostridium septique* or *Cl. chauvoei* was invariably fatal. F. considers the poor bacteriostatic action of crystal-violet to be a strong objection to the use of Gräub's vaccine.

III. The spread of F. & M. disease in Switzerland in the winter of 1938–39 gave the opportunity for extension of the preliminary experiments made with crystal-violet vaccine in 1938.

The method of preparation was as follows. Defibrinated virulent blood was obtained with aseptic precautions from animals which had not developed full lesions, but had a temperature of over 104°F. A 1% aqueous solution of

crystal violet sterilized in the autoclave was added to give a final concentration of crystal violet of 0·03%. The crystal-violet blood was then incubated for ten days at 37°C., when it was no longer infective. It was tested for sterility, and the blood from a number of animals was pooled to obtain a vaccine as uniform in antigen as possible. This was used as the basis of the vaccine. An " enriched " vaccine, composed of infective blood with an equal quantity of filtrate from ground-up epithelium from the tongues of diseased cattle, is suggested as theoretically highest in antigen. The amount of epithelium used is not specified, but would appear to be less than 50 g. per litre of filtrate. Comparative tests of " enriched " and ordinary vaccine were not made, but the field trials were made with the former.

Subcutaneous injection was without effect on the health of the animals. Intramuscular or sub-fascial injection sometimes caused necrosis. The authors state that FREI's [see II] objection to the vaccine on the grounds of poor bacteriostatic action of crystal violet, is met by the care taken in preparation to avoid contamination. [The exact means taken to achieve this end is not stated.] They state that of 12,421 large animals inoculated, only four died.

Protocols of contact experiments are given. In general the protection given by the vaccine seemed to be sufficient to guard against infection by indirect means, since vaccinated animals in the same shed and handled by the same attendants as diseased animals did not develop the disease. Only when contact was prolonged and close, as when animals occupied neighbouring stalls, did breakdowns occur. When lesions appeared in vaccinated animals, they were mild in character and commonly limited to one or two small vesicles in the mouth. No systemic disturbance took place in such animals. The protection afforded by serum is compared unfavourably with that given by the vaccine, as a group of young bulls brought into affected premises after serum inoculation, were much more severely affected than vaccinated animals under the same conditions.

In the control of F. & M. disease in the canton of Berne, 12,421 large animals were inoculated with the vaccine. There were 0·17% breakdowns, most of which occurred in animals in very poor condition. There were 0·62% post-vaccinial cases, where the disease appeared within 14 days of inoculation, before immunity was established.—J. B. BROOKSBY.

DE BRITO GUTTERRES, J. (1938). A febre aftosa em Moçambique. **[Foot and Mouth Disease in Mozambique].**—*Rev. Med. vet., Lisboa.* **33.** 325–343.

The author describes a mild form of foot and mouth disease which appeared in cattle in the Limpopo valley in December 1937. It was noted that the disease was not transmitted to pigs, sheep, or goats in close contact with affected cattle, and all attempts to infect them experimentally failed. Attempts to infect rabbits and g. pigs as well as human beings also failed.—MILLER WATSON.

BAWA, H. S. (1940). **Rinderpest in Sheep and Goats in Ajmer-Merwara.**—*Indian J. vet. Sci.* **10.** 103–112. 4 text-figs., 3 figs. on 1 plate, 3 tables. [9 refs.]

The incidence appeared to be seasonal, starting in March and continuing until the monsoon. Cattle and buffaloes in contact with the affected sheep were not affected. When sheep and goats do contract the disease it is usually from contact with rinderpest-affected cattle. This suggests attenuation of the virus by goat passage. Subinoculation with blood from sheep in the early stages of the disease caused a thermal reaction with lachrymation, vesicles on the lips, and soft faeces in a buffalo calf, and thermal reactions only in a goat and a sheep. Inoculation of spleen from a subinoculated sheep confirmed the diagnosis of rinderpest. The first symptoms were a rise in temperature from 105°–106·5°F. with marked depression and anorexia. Many animals coughed frequently, and there was a thick nasal discharge. Constipation was followed by diarrhoea. Vesicles were found in 20% of the cases. Pneumonic changes were found P.M. in 35–45%. The chief lesions were congestion and ulceration of the gastro-intestinal tract. Ordinary anti-rinderpest serum was useless as a curative, but goat tissue vaccine gave encouraging results as a prophylactic.—R. FISHER.

BIRAGO, D. (1939). Essai d'immunisation avec le vaccin provenant de veaux à peste atypique. **[Immunization with Vaccine Prepared from Calves with Atypical Rinderpest].**—*Bull. Serv. zootech. Epiz. A.O.F.* **2.** No. 4. 5–7. 1 table.

The inconstancy of rinderpest reactions in calves in Macina [French Sudan] has hindered immunization work. The disease frequently

runs an atypical course, many of the classical symptoms being absent or delayed. Vaccine was prepared from such cases and tested and after the results had been studied it was considered that the method might be of value.

In a note from the research laboratory at Bamako [French Sudan], however, it was pointed out that so-called atypical cases might be considered as mild cases occurring in partially resistant animals, and that the results should be accepted with reserve, pending further work. In most cases, the vaccine had been used on animals from a region where rinderpest is endemic and many animals were resistant, yet the subsequent virus inoculation caused a strong reaction. If used in more susceptible animals accidents might occur. Moreover, it was felt that the choice of suitable animals for vaccine production would be very difficult if typical symptoms were not present. There would be risk in the use of such vaccines.

—H. E. Harbour.

Charitat. (1939). Vaccin antipestique preparé avec la pulpe residuelle. [**Rinderpest Vaccine Prepared from Residual Pulp**]. — *Bull. Serv. zootech. Epiz. A.O.F.* **2.** No. 4. 1–4. 2 tables.

C. describes the preparation of a " second " vaccine from the pulp left on the filter [presumably in the preparation of a first vaccine, method not being specified]. This material was suspended 1 : 10 in 0·4% formol saline, the suspension being filtered through a coarse sieve to remove the largest particles. The vaccine was given by means of a cannula attached to a syringe. The dose was 20 c.c. for calves and 50 c.c. for adult bovines. Local oedema was noted 2–3 days after inoculation, but this disappeared after 15–20 days ; abscesses were rarely formed. In tests on 257 bovines, all were resistant to a test dose of virus given 14 days later. No detailed observations on the duration of the immunity were made, but one calf was found to be susceptible 126 days after inoculation. The vaccine was still active 8–10 days after preparation.—H. E. Harbour.

Fukusho, K., & Nakamura, J. (1940). **On the Experimental Infection with Rinderpest Virus in the Rabbit. II. Pathology**].—*Jap. J. vet. Sci.* **2.** 75–101. 12 figs. on 3 plates, 2 tables. [1 ref.] [In Japanese : abst from English summary]. [For Part I, see *V. B.* **9.** 586].

The authors carried out numerous experiments in rabbits at the Government Institute for Veterinary Research, Fusan, Chosen. The principal lesions were necrosis of Peyer's patches and the lymph nodes. These were apparent from the third day after intravenous or subcutaneous inoculation of " rabbit passage virus ", until the seventh or eighth day, when they begin to become indistinct. Other organs and tissues appeared normal. In animals killed at the earlier stages of infection, the spleen was slightly enlarged. It is stated that similar changes in the lymphatic tissues of rabbits have not been observed before except in the case of natural or artificial septicaemic infection with *Salmonella typhi-murium*. Rabbits were immune after being infected once.

The authors describe their observations on the histopathology of the lymphatic tissue of the alimentary canal, the lymph nodes, the spleen, the thymus gland, the lungs, and other organs. The characteristic changes in the lymphatic tissue consisted of degeneration and reduction of the cells and swelling and proliferation of the reticulo-endothelial cells. These changes might lead to the formation of necrotic lesions, which were a constant feature in Peyer's patches. Lymph nodes and spleen showed similar changes, but these organs were less intensively affected and there were no distinct necrotic changes.

Congestion and slight haemorrhage were present in the thymus gland and in the lungs, and sometimes degeneration of the lymphatic cells was seen in the peribronchial interstitial tissue. In the other organs and tissues, no constant morphological changes were observed.

Slighter but otherwise similar changes were found in rabbits infected with cattle virus.

—L. Tobback.

Haring, K. (1937). Untersuchungen am Kaninchen und Pferd über den kutanen Infektionsweg bei der ansteckenden Blutarmut der Pferde wie über die Empfänglichkeit des Schafes für das Anämievirus. [**Cutaneous Infection of Rabbits and Horses with Equine Infectious Anaemia and the Susceptibility of Sheep to the Virus**].—*Inaug. Diss., Hanover.* pp. 72. Numerous tables, charts. [Numerous refs.]

Rabbits reacted by a fall in the red blood corpuscles and haemoglobin contents of the blood and by fever to E.I.A. virus placed on their intact skin, after an incubation period of 47–52 days. A horse reacted likewise in

similar circumstances. A lamb inoculated subcutaneously with E.I.A. virus showed fever and general malaise, but no haemopoietic reaction. It cannot be said that as a result of this work rabbits or sheep are susceptible to E.I.A.—J. E.

KERNKAMP, H. C. H. (1940). **The Reticulo-Endothelial System and Immunity in Hog-Cholera.**—*J. Immunol.* **39.** 85–88. 1 table.

A group of 24 pigs was injected intraperitoneally with a suspension of trypanblue at the rate of 10–40 mg. of the dry substance per lb. body weight in one or two doses, the dye being given prior to, or at the same time as, the immunizing treatment (serum in the usual dose or down to 50% of this + virus in the usual dose). Marked blueing occurred within 24 hours, was intense at 48 hours, and was still present in the blood vessels, bone marrow, liver, spleen, kidneys, etc., at five months in eight pigs then examined. All the pigs, together with 13 controls, were tested 84–116 days after immunization. Three blockaded pigs and one control died. It is concluded that the immunity mechanism which functions in swine fever, presumably the reticulo-endothelial system, is not disturbed by blockading with trypanblue.—A. W. STABLEFORTH.

—. (1939). **Report of the Committee on Rabies.**—*Proc. 42nd ann. Meet. U.S. Live Stk sanit. Ass., 1938.* pp. 61–62.

Some figures relating to the incidence of rabies in nine states in 1938 are given and notes are included on diagnosed cases and Pasteurian treatment in Illinois. It is stated that all states except Maine, South Carolina, Kansas, and Oklahoma have quarantine regulations for rabies control. In practice, however, no state exercises effective control over rabies and veterinary authorities find it impossible to cause state and municipal authorities to put adequately into force existing regulations.

The committee therefore recommends federal action to initiate a really effective campaign against the disease.—J. E.

MARTINS, E. V. (1938). Raiva. **[Rabies].**—*An. Serv. Vet. Pec. Angola, 1937.* pp. 99–103.

M. reports a number of cases of rabies in man and animals, occurring in the colony. The most frequent transmitters of the disease were dogs, but other carnivores were also responsible.

M. refers to spread by genets, civets, and various wild felines in the Union of South Africa, and points out that all these animals are found in Angola. He refers to AUSTIN ROBERTS' [(1935). *S. Afr. J. Sci.* **32.** 414.] suggestion that bubonic plague and rabies are conflicting problems in Africa, as the small carnivores which destroy the transmitters of plague are themselves destroyed because they transmit rabies.

M. outlines the history of the arrival of rabies in Angola, accompanying the migration of people and cattle.

He regrets the lack of accurate statistics on rabies in the colony, but believes that the incidence is increasing.—MILLER WATSON.

REMLINGER, P., & BAILLY, J. (1940). Premier cas marocain de la maladie d'Aujeszky. **[First Case of Aujeszky's Disease in Morocco].**—*Bull. Acad. Méd. Paris.* **123.** 238–239. [4 refs.]

The virus was recovered from a dog which showed a completely atypical syndrome, the main symptoms being a gastro-enteritis. The virus was fully pathogenic for the usual experimental animals and showed no obvious difference from standard strains obtained from Hungary, America, etc. In view of the apparent absence of the disease in Morocco, it is suggested that the virus may exist in an " inapparent " form.—R. E. GLOVER.

COPISAROW, M. (1939). **Some Biochemical Factors of Influenza and Other Viruses.**—*Edinb. med. J.* **46.** 46–49. [Numerous refs.]

Consideration of the nature of viruses and of the physico-chemical reactions symptomatic of their activity leads C. to enquire whether all viruses may not be regarded as enzymic proteins of different configuration and to suggest a treatment for influenza based on the coagulation of the specific enzymic protein by suitable precipitants such as ammonium sulphate. From these considerations C. deals discursively with the possibilities of a chemical theory of the spontaneity of virus diseases. The paper contains no original experimental data.—A. EDEN.

BIELING, R., & OELRICHS, Lilly. (1938). Das makroskopische und mikroskopische Bild der Grippe-Pneumonie bei der Maus. **[Gross and Microscopic Pathology of Influenzal Pneumonia in Mice].**—*Behring.-Mitt.* **9.** 28–45. 10 figs. on 6 plates. [2 refs.]

Mice were anaesthetized with ether and infected by immersing the nose in virus-containing fluid and allowing a few gasping inspirations to occur. In mice killed at the height of the infection 4–5 days later, the lungs were bright red in colour and consolidated. The marked increase in lung volume and presence of pleurisy which occur in pneumococcal infection in mice were absent.

The earliest histological changes were seen at about two days after infection in the form of marked congestion of vessels with margination and emigration of leucocytes. There followed a perivascular collection of leucocytes and collapse of adjacent alveoli, whilst alveoli at a greater distance were often over-distended. There also occurred, as in pneumococcal infection, desquamation of bronchial epithelium due to the formation of exudate beneath it which caused it to be lifted from the underlying bronchial wall over considerable areas. In contrast with these changes, pneumococcal infection is characterized by the formation of a peribronchial serous exudate which results in considerable increase in lung volume. In influenzal pneumonia the lesion is very different; the amount of exudation is small and there is collapse and induration.—E. G. White.

Graham, R., Brandly, C. A., & Levine, N. D. (1939). **The Effects of Hard X-Rays and Ultra-Violet Light upon Fowl Pox Virus *in vitro*.**—*Cornell Vet.* **29.** 383–391. 3 tables. [Numerous refs.] [Authors' summary copied *verbatim*].

Suspensions of fowl pox virus grown on the chorio-allantoic membranes of developing chicken eggs were irradiated with x-rays and ultra-violet light. Dosages up to 888 *r* units of hard x-rays were used, with no effect which could definitely be attributed to the x-rays. The virus was inactivated by ultra-violet light from a mercury vapor lamp in 2 hours at 20 cm. and attenuated by irradiations of from 15 to 90 minutes. A concentration of 1–50,000 methylene blue added to the virus suspension reduced the irradiation time necessary for inactivation to 5 minutes, while a 2½ minute irradiation markedly attenuated the virus.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

McBride, J. R. B. (1939). **Ophthalmomyiasis.**—*Brit. med. J.* April 1st. 672–673. [8 refs.]

A case record of infestation of the conjunctival sac of a girl by *Oestrus ovis* larvae.—J. E.

Nash, T. A. M. (1938). **The Probable Effect of Densification of Woodland upon the Distribution of Tsetse in Northern Nigeria.**—*W. Afr. med. J.* **10.** 10–13. [6 refs.]

N. contrasts the habitats of *Glossina morsitans*, *G. tachinoides*, and *G. palpalis* in East Africa and Nigeria, and explains why the densification of the vegetation by the exclusion of fire which has produced such good results in the extermination of tsetse in East Africa produces the entirely opposite effect in Nigeria. The extremes of climate in the latter country are much greater, rising well above the optimum critical temperature zone of the flies, so that the only method the fly has of avoiding dangerous climatic conditions is to seek out the milder climates that exist within thickets and residual forest islands whose layers of vegetation keep out the sun and winds and conserve the moisture.

Gear, J., & de Meillon, B. (1939). **The Common Dog Tick *Haemaphysalis Leachi* as a Vector of Tick Typhus.**—*S. Afr. med. J.* **13.** 815–816. 2 figs., 1 table. [3 refs.]

A number of cases of tick bite fever associated with dog ticks have occurred in human beings on the Witwatersrand. In some of these cases, an emulsion of ticks taken from dogs in the patient's house produced tick bite fever in g. pigs. Successful transmission to g. pigs was also obtained by allowing specimens of *H. leachi*, from a house where there was a case of tick bite fever, to feed on g. pigs. Local lesions occurred resembling those seen in tick bite fever, with enlargement of the lymph nodes. The infection was carried on through twelve passages by means of inoculation of brain or lymph node emulsions. Rickettsiae were observed in smears from the lymph nodes. The identity of the rickettsiae was confirmed by cross immunity tests on g. pigs immune to tick bite fever.—E. M. Robinson.

Roetti, C. (1939). Gli Ixodidi dello Scioa e del Gimma. [**Ixodids of Shoa and of Jimma (Abyssinia)**].—*Riv. Biol. colon.*

2. 185–192. 2 figs. [17 refs.] [English, French and German summaries].

An enumeration of the Ixodidae found by R. in Shoa and Jimma, especially those acting as vectors in the transmission of rickettsiasis and theileriasis.—E. MARTIN.

FAHRENHOLZ, H. (1939). Die Läuse der Schweine. [**The Lice of Swine**].—*Z. InfektKr. Haustiere.* **55.** 134–154. 9 figs., 1 table. [7 refs.]

F. reviews the systematic literature on the lice of swine and attempts to clear up the confusion resulting from the displacement, in the 18th century, of domesticated varieties of the European wild pig by Asiatic strains. From examination of specimens from different hosts and localities he suggests that the specific name *Haematopinus suis* should be transferred to the louse (*H. aperis* Ferris 1933) of the European wild pig *Sus scrofa*. He recognizes the species *H. adventicius* Ewing 1934 (occurring on the pig *S. vittatus* in southern Asia, Australia, East Africa, and the Mediterranean coast), and erects the species *H. chinensis* for the louse of the present-day varieties of domestic pig, and for that of the Asiatic wild pig. The lice of related genera of Suidae, *e.g.* bush pigs and wart hogs, are also described.—J. MACLEOD.

EICHLER, W. (1939). Untersuchungen zur Epidemiologie der Aussenparasiten. II. Masseninvasionen von Ektoparasiten. [**Epidemiology of External Parasites. II. Mass Invasions**].—*Arch. wiss. prakt. Tierheilk.* **75.** 212–221. 1 fig. [Numerous refs.] [For part I, see *V. B.* **9.** 783].

A case of mass infestation by *Trichodectes canis* in a dog is described. Before the animal died only a few lice were observed, but soon after death E. collected 6,000 lice from it. A total of 20,000 lice was collected, but this figure is incomplete as the young larvae were not removed by the comb.

The remainder of the article describes reported cases of mass infestation by various arthropod parasites of animals and man.

—A. L. WILSON.

ENDREJAT, E. (1939). Ueber die Schaf- und Ziegenräude. [**Sheep and Goat Mange**]. —*Tierärztl. Rdsch.* **45.** 637–639.

The conditions of occurrence of psoroptic and sarcoptic mange in sheep and goats in Iran are discussed, with measures for control in areas in which transport facilities are primitive. Dipping in appropriate concentrations of sodium arsenite, or home-made "lime sulphur", or "antisarnico" [a proprietary Bayer product], using a small portable iron bath, was effective, the choice of agent being less important than thorough breaking down of scabby crusts with pumice stone. Goats tolerated immersion treatment less well than sheep, and the most resistant cases of sarcoptic mange were periodically slaughtered for food, the lighter cases being hand-dressed with wood tar. Sarcoptic mange of the head was widespread in sheep and yielded best to hand-dressing with wood tar twice at eight-day intervals. Paraffin oil [kerosene] was also effective but three dressings were required.

—H. H. GREEN.

HAMERTON, A. E. (1939). **Pulmonary Acariasis in Monkeys.**—*IV Congr. int. Pat. comp., 1939.* **2.** 271–273. [In English]. [Author's summary copied *verbatim*].

A lethal parasitic acarid—Pneumonyssus semicola—infesting the lungs of captive wild monkeys (Macaca mulatta) is described. All stages of the life history of the parasite are believed to occur in the body of the monkey. It is not known how they become infested. The anatomical and the histological lesions caused in the lungs by this parasitic mite are specified. There are no characteristic clinical signs or symptoms by means of which the parasitic origin of the disease can be diagnosed during life. Sanitary precautions for the control of the disease are noted. References to the literature dealing with parasitic mites are given.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

EFIMOV, A. E. (1938). Do vivchennya fauni parazitichnikh cherviv sviis'kikh m'yasoïdnikh tvarin URSR. [**Helminth Parasites of Dogs and Cats in the Ukraine**].—*Trav. Mus. zool., Kiev.* No. 21/22. 177–186. [10 refs.] [In Ukrainian: French and Russian summaries]. [Abst. from Russian summary].

E. states that 97·8% of the dogs and 100% of the cats of the Ukraine harbour parasitic worms.

Eighteen species were found in dogs (7

trematodes, 6 cestodes, and 5 nematodes) and 14 species in cats (7 trematodes, 3 cestodes, and 4 nematodes). Seven of the species were pathogenic to man, *viz*, *Opisthorchis felineus*, *Metagonimus yokogawai*, *Dipylidium caninum*, *Echinococcus granulosus*, *Multiceps multiceps*, *Toxascaris leonina*, and *Toxocara mystax*. In addition the larvae of two species (*Ancylostoma caninum* and *Uncinaria stenocephala*) could exist as transient parasites in man, although they could not develop there.

Altogether 24 species of helminths have been found in dogs in the Ukraine and a list of these is given.—E. MARTIN.

DIALER, L. (1938). Zur Histopathologie parasitärer Knochenerkrankungen. (Alveolar-Echinococcus des Knochens und Troglotrema-Osteomyelitis). [**Histopathology of Parasitic Bone Diseases. Alveolar Echinococcus in Bone and Troglotrema Osteomyelitis**].—*Frankfurt. Z. Path.* **52.** 547–566. 9 figs. [Numerous refs.]

This is a detailed description of the histological picture of a human case of widespread echinococcal lesions in various organs including the cranium and the fifth rib. Particular attention is paid to the reaction of the bone tissue in the immediate vicinity of the parasite.

Similar studies were made of the changes produced in the cranium of a polecat (*Putorius putorius*) by invasion of the trematode *Troglotrema aclitum* from its normal site in the nasal cavity. The reaction took the form of a rarefying osteitis and osteomyelitis.—E. G. WHITE.

DELAUNE, Elaine T., & MAYHEW, R. L. (1939). **Studies on the Bovine Blood Picture in Hookworm** (*Bunostomum phlebotomum*) **and Nodular Worm** (*Oesophagostomum radiatum*) **Infections.**—*J. Parasit.* **25.** Suppl. p. 36.

Studies on the erythrocyte, leucocyte, and differential cell values were made on two calves infected with nodular worms and three infected with hookworms and nodular worms. In both types of infection there was a greater range in all counts, as well as a decrease in the erythrocyte and an increase in the leucocyte counts, as compared with the pre-infection periods of the same animals and with controls kept concurrently under the same management. The same blood changes were also obtained in a naturally infected Brahman heifer. Data are presented on the blood picture of normal, healthy, castrated males on pasture, and cows in a dairy herd, for comparison with the experimental animals.

FOSTER, A. O., & ALICATA, J. E. (1939). **Notes on Parasites of Horses in Hawaii.**—*Proc. helminth. Soc. Wash.* **6.** 4–8. [11 refs.] [Abst. from authors' summary].

The authors listed 29 species of endoparasites. There were 19 strongylid species representing 9 genera. The genera from domestic equines not represented in this survey are *Oesophagodontus* (only species, *O. robustus*), *Craterostomum* (*C. mucronatum* and *C. macuticaudatum*) and *Cylicobrachytus* (*C. prionodes* and *C. brevicapsulatus*). In commenting on the Strongylidae, mention was made of all the valid species contained within the several genera and such notations were made upon their distribution and relationships as seemed desirable for a foundation to further study both in Hawaii and elsewhere.

GLASER, R. W., & STOLL, N. R. (1940). **Exsheathing and Sterilizing Infective Nematode Larvae.**—*J. Parasit.* **26.** 87–94. 2 figs., 1 table. [5 refs.]

Details of a process of obtaining exsheathed, uninjured and sterile third stage forms of certain nematodes are outlined. Nematodes so treated include *Haemonchus contortus*, *Ostertagia circumcincta*, *Trichostrongylus axei*, *Obeliscoides cuniculi*, and *Nippostrongylus muris*. The method is similar to that described by LAPAGE [*V. B.* **5.** 32, and **6.** 50.] for Milton solution, except that in this case a 1 : 20 Labarraque's solution was used (a similar preparation containing not less than 2·6% of sodium hypochlorite in contrast to 1·01% in Milton). Labarraque's solution is said to be less stable than Milton, but tests carried out to determine its stability, its power to exsheath, to sterilize, and to permit subsequent development to the fourth stage of *H. contortus* larvae showed that it was effective after 190 days storage in a dark bottle at 5°–7°C. Milton also proved stable, but results with Carrel-Dakin's solution were uncertain. The authors conclude that the chief factors involved in the exsheathing process are physico-chemical.—M. L. BINGHAM.

ROGERS, W. P. (1939). **Nematode Parasites of Sheep in Western Australia.**—*J. Helminth.* **17.** 151–158. 4 tables, 1 graph. [12 refs.]

A survey of the parasites present in 407 sheep was made. Altogether 18 different

species of nematodes were found, of which 3, *Trichostrongylus rugatus*, *T. probulurus* and *Ostertagia mentulata* had not previously been recorded in Western Australia. *Trichostrongylus* spp. were present in 74% of sheep and *O. circumcincta* was of next importance. A table showing the degree of infestation with all species is included: the maximum number in one sheep was 14,000 worms. Highest infestations were found during late summer, while the lowest infestations occurred during the winter months. The seasonal incidence of the various species was also studied. The number of eggs passed by each female was found to be greater in winter. The egg output fell as the degree of infestation increased, *i.e.* it was found to increase until 1,000 parasites were present, but decreased after this number was exceeded. —M. L. BINGHAM.

MAYHEW, R. L. (1939). **Studies on Bovine Gastro-Intestinal Parasites. I: The Mode of Infection of the Hookworm and Nodularworm.**—*Cornell Vet.* **29.** 367–376. 1 fig. [5 refs.]

The calves used in the experiments were obtained from half-an-hour to five days after birth, and strict measures were adopted to prevent infestation by parasites other than *Strongyloides*. Larvae of *Bunostomum phlebotomum* and *Oesophagostomum radiatum* were obtained from an infested pasture by the Baermann method. The inoculations were made by pouring larvae suspended in water on to the washed skin of the abdomen and flank.

Cutaneous infestation was successful with both hookworm and nodular worm larvae. Larvae left on the hair for a week survived and subsequently produced infestation when given *per os*. Severe dermatitis was observed in one calf after repeated applications of larvae. From 1–2% of the larvae cultured from infested calves survived desiccation in a dish on the laboratory bench for one week.

In view of these findings the places where calves lie down, *e.g.* the shaded parts of barns, should be taken into consideration when control measures are planned.—A. L. WILSON.

I. ROBERTS, F. H. S. (1939). **The Gastro-Intestinal Helminths of Cattle in Queensland: Their Distribution and Pathogenic Importance.**—*Proc. roy. Soc. Qd.* **50.** 46–54. 1 map. [Numerous refs.]

II. ROBERTS, F. H. S. (1940). **Notes on Some Helminths Infesting Domestic Animals in Queensland.**—*Aust. vet. J.* **16.** 30–33. [16 refs.]

I. Parasitic gastro-enteritis is not uncommon in Queensland, particularly in young cattle. Outbreaks are most numerous during winter and spring and in the coastal and subcoastal areas, where the annual rainfall is from 25–160 inches. *Haemonchus contortus*, *Cooperia pectinata*, *C. punctata*, and *Oesophagostomum radiatum* are the helminths chiefly concerned. Pathogenic infections are also seen with *Paramphistomum cervi*, *P. explanatum*, *Moniezia benedeni*, *Bunostomum phlebotomum*, and *Strongyloides papillosus*. Sub-pathogenic infections with *Trichostrongylus axei* and *Ostertagia ostertagi* occur. Symptoms and lesions are described and results of worm counts given. Numbers of *Haemonchus* varied between 5,200 and 12,000, of *Oesophagostomum* between 4,260 and 6,510, and of *Cooperia* between 95,500 and 138,000. As many as 31,500 *O. ostertagi*, 76,000 *T. axei*, 2,250 *B. phlebotomum*, 54,000 *S. papillosus*, and 17 *M. benedeni* were recorded.

Some data on egg counts are presented. Calves 6–12 months old, heavily infected with *H. contortus* and/or *O. radiatum* showed counts of 3,400–7,800 eggs per g. [E.P.G.] of faeces. Heavy *Cooperia* infestations showed 800–1,200 E.P.G. in mushy or diarrhoeic faeces. An infection with 2,250 *B. phlebotomum* showed 400–800 E.P.G. It is pointed out that many cattle showed pronounced symptoms but very low egg counts (200–400 E.P.G.), numerous immature parasites being found P.M.

II. The following helminths are recorded from Queensland for the first time:– *Trichostrongylus colubriformis* and *T. axei* in a pig, and *Taenia ovis* and *Angiostrongylus vasorum* in a dog. The occurrence of *Necator americanus* in pigs is confirmed. Examination of specimens of *Strongyloides* showed that worms from pigs could be differentiated from those from sheep and cattle by the shape of the tail as recorded by SCHWARTZ and ALICATA (1930), but marked variations were present. *Capillaria* spp. of birds are briefly discussed, and *C. columbae* is recorded as being of pathogenic significance in poultry.—H. McL. GORDON.

YOSHIDA, S., & TOYODA, K. (1938). **Artificial Hatching of Ascarid Eggs.**—*Livro Jubilar Prof. L. Travassos.* pp. 569–577. 9 text-figs., 7 tables. Rio de Janeiro: Instituto Oswaldo Cruz. [In English].

It was found that ascarid eggs, including those of *Toxocara canis*, *Ascaris lumbricoides*,

and *A. suum*, when enclosed in " a specially prepared egg membrane ", would hatch freely in various parts of the body of a rabbit other than the intestine. After 72 hours, 54% were found to have hatched in the abdominal cavity, 50% in the pleural cavity, and 48% under the skin.

It was then discovered that hatching took place also in various salt solutions, or even to the extent of 38% in tap water, when these solutions were enclosed in egg membranes and maintained at 40°C. Since the egg membrane seemed to be the important agent, an assortment of related organic solutions was tested. Provided that strict aseptic precautions were taken, the eggs could be successfully hatched in a wide variety of dilute organic solutions, including egg albumin, dog serum, human milk, and sucrose. Fresh, fully matured eggs from the uterus of the worm gave better results than those from faeces. The optimum temperature range was 36°–40°C. The highest percentages of hatched larvae (80–85%) were obtained in 0·05% glucose or peptone solutions. In the case of peptone, hatching was most active after one or two days, and in glucose after 3–7 days ; larvae hatched in glucose were stronger and more resistant to chemical action.—E. S.

AUGUSTINE, D. L. (1939). **Observations on some Ascarids from a Chimpanzee (Pan troglodytes) with Experimental Studies on the Susceptibility of Monkeys (Macaca mulatta) to Infection with the Human and the Pig *Ascaris*.**—*Amer. J. Hyg.* Sect. D. **30.** 29–33. [10 refs.] [Author's summary copied *verbatim*].

Mature ascarids, smaller but otherwise morphologically identical with *Ascaris lumbricoides* and *A. suum*, are reported from *Pan troglodytes*. Attempts to infect monkeys (*Macaca mulatta*) kept on adequate diets, and on a diet deficient in vitamin A, with human and swine ascarids were not successful. The results of the experiments indicate that the monkey *Ascaris* is physiologically distinct from the strains in human beings and in swine.

LUCKER, J. T. (1939). **The Effect of Some Halogenated Hydrocarbons on the Eggs of *Toxocara canis* (Nematoda).**—*Proc. helminth. Soc. Wash.* **6.** 51–57. 4 tables. [Author's summary copied *verbatim*].

Some eggs of *Toxocara canis* became embryonated in cultures initially consisting of 1 part of chlorosol or dichloropentanes and 14 parts of water ; chlorosol delayed the development of the eggs. Dichloropentanes prevented the larvae in embryonated eggs from reaching a normal structure to a greater extent than chlorosol.

Practically all eggs placed on moist soil in small dishes and exposed to small amounts of chlorosol or ethylene dichloride, under conditions minimizing loss of the chemical vapors from the containers in an initial period of 48 to 96 hours, failed to become embryonated or undergo appreciable development and were evidently killed. Practically all embryonated eggs similarly exposed to chlorosol for 96 hours were also killed. Under the same conditions, dichloropentanes and carbon tetrachloride were ineffective in preventing embryonation of the eggs ; development was delayed by carbon tetrachloride. Dichloropentanes was not effective against embryonated eggs under similar conditions.

Since minimal quantities of ethylene dichloride, regarded also as the lethal constituent of chlorosol in the experiments, were not effective against the eggs unless the vapors were closely confined to the soil for from 2 to 4 days, difficulties are to be anticipated in finding a method for effectively applying the chemical to soil under practical conditions.

ERHARDT, A., & DENECKE, K. (1939). **À propos de la strongyloïdose des chats. [Strongyloidosis in Cats].**—*Ann. Parasit. hum. comp.* **17.** 206–208. 1 graph. [5 refs.] [Translation of authors' summary].

1. Egg deposition of a new species of *Strongyloides* in the cat takes place very irregularly and resembles that of *Ancylostoma caninum* (Ercolani) in the cat much more than that of *Strongyloides ratti* Sandground in the rat.

2. The female of this new species of *Strongyloides* laid on an average at most 263 eggs per day, in the only cat experimentally infected.

ROGERS, W. P. (1939). **The Physiological Ageing of Ancylostome Larvae.**—*J. Helminth.* **17.** 195–202. 1 text fig., 1 fig. on 1 plate, 2 tables, 2 graphs. [7 refs.] [Author's summary copied *verbatim*].

1. The activity, infectivity and fat content of ageing infective larvae of *Ancylostoma caninum* were investigated at regular intervals.

2. The reduction in activity and fat content was found to occur at a similar rate.

8. As the larvae aged it was found that the initial fall in activity and fat content was greater than the fall in infectivity, especially in slowly aged larvae. Small numbers of larvae were found to be infective even when their fatty food reserve seemed exhausted.

4. Dark granules, possibly excretory products, were found to accumulate in the intestines of old larvae.

MILLER, M. J. (1939). **The Egg-count Index of *Trichocephalus vulpis* Infections in Dogs.**—*Proc. Soc. exp. Biol., N.Y.* **42.** 301–303. 1 table. [5 refs.]

Six whipworm-free dogs, including two puppies, were artificially infected with embryonated eggs of *Trichuris* (= *Trichocephalus*) *vulpis*. As soon as each animal became positive, egg counts were carried out daily until a constant value had been reached and maintained for at least 18 days. The animals were then killed, and all adult *T. vulpis* removed and counted.

Each adult female worm was found to lay an average of 2,035 eggs daily. Since the ratio of male to female worms was 1 : 2, each 1,350 eggs in the faeces represented one worm in the host.—E. S.

WEHR, E. E. (1939). **The Gapeworm as a Menace to Poultry Production.**—*Proc. 7th World's Poult. Congr., 1939.* pp. 267–270. [11 refs.] Washington, D.C.: U.S. Dep. Agric. [In English].

This is a general account of *Syngamus trachea* infestation in fowls and other birds. Under laboratory conditions young turkeys were shown to be more susceptible than chicks to gapeworm infestation. W. discusses the importance as vectors of several species of earthworms, which may serve as reservoirs for the infective larvae during the cold months of the year.

In fowls a primary infestation with this worm was not found to confer any immunity to a second infestation [interval between the two infestations not stated].

Inhalation of barium antimonyl tartrate in the form of dusts was found in the laboratory tests to be an effective remedy.—S. G. IYER.

BAKER, D. W., SALISBURY, G. W., & BRITTON, J. W. (1939). **Control of Equine Strongylosis. Part I. The Effect of Natural Factors on the Development of Strongylosis in Foals.**—*Cornell Vet.* **29.** 297–308. 1 table. [15 refs.]

Egg counts were made over a period of 5 months on 12 purebred Percheron or Belgian mares with their foals. An age resistance to *Strongyloides westeri* was observed, and age resistance to *Ascaris equorum* was confirmed.

The most outstanding observation was the remarkably low number of infective larvae picked up by the foals from the large number available. The average rate of pick-up for all the foals was 1 in 32,000,000, which suggests the operation of natural factors tending to limit the development of eggs and larvae on pasture. These factors may be divided into three groups, *viz*, those affecting the development of larvae from the eggs, those affecting the transmissibility of infective larvae, and those affecting the parasitic development of the larvae. Temperature is important in the first group of factors. In freshly-passed, unspread horse faeces it was found that 18% of the eggs remaining on the pasture after 65 days failed to hatch, while 50% failed to hatch after 150 days. In spread samples of faeces 81% of the eggs remaining after 65 days failed to hatch into infective larvae, while neither pre-infective nor infective larvae were obtained after 90 days. In view of these facts chain-harrowing of the pastures in the autumn is recommended, as this will spread the faeces and expose the contained eggs and larvae to the adverse temperatures of winter.

Experiments were carried out to ascertain whether larval activity had any effect on the duration of larval life. Larvae whose physiological age had been estimated by staining their fat content with Sudan III were submitted to varying temperatures. It was observed that the more active larvae quickly lost their fat. Many larvae, when ingested, may thus be too weak to establish themselves in the host.

A greater resistance was found among the Belgian foals than among the Percheron foals. The average rate of pick-up in the former was 1 in 52,000,000 while in the latter it was 1 in 17,000,000.—A. L. WILSON.

NORDSTRÖM, G. (1940). Microfilarios hos häst. **[Microfilariasis in the Horse].**—*Beretn. 5. nord. Vet.-møde, Kbh., 1939.* pp. 937–948. 1 table. [German summary].

Microfilariasis is a common infection of horses in Sweden; thus in 1937 a 60% infection rate was determined in yearling foals in one central area. N. gives several case records of microfilariasis observed in Stockholm veterinary college. It occurs commonly in young

horses during the spring, usually in conjunction with other worm parasite infestations, so that it is difficult to describe a syndrome of microfilariasis alone. Various kinds of illness and debility are seen. The greatest number of microfilariae observed was 1,500 per c.c. of blood, 200–500 being the usual range. In some cases specimens of *Setaria equina* were found in the peritoneal cavity of affected horses : it is, therefore, suggested that the microfilariae are embryos of this species. It does not seem likely that insects play any part as vectors in Sweden.—J. E.

I. Pierce, H. B., Hartman, E. E., Simcox, W. J., Aitken, T., Meservey, A. B., & Farnham, W. B. (1939). **Blood Chemistry in Human Trichinosis.**—*Amer. J. Hyg.* Sect. D. **29.** 75–81. 1 table, 3 charts. [19 refs.]

II. Hartman, E., Foote, M., & Pierce, H. B. (1940). **Blood Chemistry Findings in Early Trichinosis of Dogs.**—*Ibid.* **31.** 74–75. [2 refs.]

I. Blood analyses for Ca, P, sugar, non-protein nitrogen, Cl, and cholesterol were commenced on 44 human patients four weeks after they had contracted trichinosis and continued weekly for a further two months. In the early stages all figures showed low normal values which rose during the period of convalescence. The addition of cod liver oil and Ca gluconate to the diet of half these patients was without any marked effect on any of the blood constituents.

II. Similar analyses to those reported in I were carried out on dogs artificially infected with *T. spiralis*. There was a marked decrease in the food intake during the first week after infection, but no significant changes in any of the blood constituents under examination occurred, which could be attributed to the resulting trichinosis.—Alfred Eden.

Baudet, E. A. R. F. (1940). Experimentelle Infektionen von Ratten and Mäusen mit Trichinen. [**Experimental Trichinosis in Rats and Mice**].—*Z. InfektKr. Haustiere.* **56.** 145–151. 6 tables. [6 text refs.]

B. gives the results of experiments on the feeding of white mice and rats with infected homologous muscle. The test animals were killed 3–6 months later, and the diaphragm and masseter muscles examined. Doses of 2 or 3 trichinae failed to produce infection in rats, and only a small number of mice was positive. With heavier doses a large number of both species became infected, but very wide variations were obtained in the numbers of trichinae in the musculature. Fasting the animals for 24 hours prior to dosing did not affect the results. B. concludes that such counts are unsuitable as a measure of possible immunity in the above animals.—J. MacLeod.

IMMUNITY

Vásárhelyi, J., & Gözsy, B. (1939). Ein Verfahren zur Herstellung gereinigten Tuberkulins. [**Preparation of Purified Tuberculin**]. — *Z. ImmunForsch.* **97.** 255–265. 1 table. [15 refs.]

Gözsy, B., & Vásárhelyi, J. (1939). Die chromatographische Adsorption des gereinigten Tuberculins. [**Chromatographic Adsorption of Purified Tuberculin**].—*Ibid.* 265–272. 2 tables. [6 refs.]

A simplified method is described for preparation of purified " tuberculin protein derivatives " *i.e.* the T.T. of Jensen, analagous to the P.P.D. of Seibert. Cultures of the Copenhagen " Plum E " avirulent human strain of *Mycobacterium tuberculosis* were grown on Sauton's synthetic medium, steam heated after falling of the pellicle, and filtered through paper. The clear filtrate, without further concentration, was saturated with powdered ammonium sulphate, the precipitated protein filtered off, redissolved in a small amount of normal saline ($\frac{1}{20}$th of original volume), the solution dialysed through cellophane to remove ammonium sulphate, and re-precipitated with trichloracetic acid at 6% concentration. After repeated centrifugal washings with trichloracetic acid the precipitate was transferred to a desiccator, partially dried *in vacuo* over $CaCl_2$ and extracted, in the centrifuge tube, with successive small quantities of dry ether to remove trichloracetic acid. After evaporation of residual ether the almost white, dry powder contained about 13·5% of nitrogen, and in g. pig tests showed the same potency as the standard Danish T.T.

II. A purified T.T., analagous to Seibert's P.P.D. prepared by the method described by the authors in I was studied by adsorption and

elution methods. The product was not adsorbed by aluminium hydroxide but was completely adsorbed by *Faserntonerde* [a fibrous clay similar to fuller's earth] and by activated cerussite (*Bleierde*) from which it could be eluted at the appropriate pH. Failure to purify further led to the conclusion that T.T. was a single substance of high purity.

From animal experiments it was concluded that T.T. could be regarded as a hapten. Although not an antigen in the ordinary sense g. pigs could be sensitized to the tuberculin reaction by very high doses absorbed on *Faserntonerde* and precipitin reactions obtained with sera of both g. pigs and rabbits subcutaneously injected with 18·5–40·5 mg. T.T. so adsorbed.—H. H. Green.

Sa Viana Conte, H. E. (1938). Preparação de tuberculinas aviárias e estudo dos seus valores alérgicos. [**Preparation of Avian Tuberculin and its Allergic Value**]. —*Repos. Lab. Pat. vet., Lisboa.* **4.** 91–105. 10 figs. on 3 plates, 11 tables. [3 refs.] [English and French summaries].

A series of tuberculins was prepared from a single strain of avian *Mycobacterium tuberculosis* in Sauton's medium, Henley's medium, and 5% glycerin veal broth. Tests were made on fowls and rabbits, and the results compared with the reactions obtained from a tuberculin prepared in the *Rijksseruminrichting* at Rotterdam. The most satisfactory tuberculin was that prepared from the culture on Henley's medium; it gave results comparable to those of the Rotterdam preparation.—M. Watson.

van Deinse, F. (1939). Production tardive de "tuberculine" dans une culture de saprophytes acido-résistants. [**Belated Production of Tuberculin in Culture of an Acid-Fast Saprophyte**].—*C. R. Soc. Biol. Paris.* **132.** 358–359. [1 ref.]

Loukidis (1935) isolated a saprophytic acid-fast bacillus from tap water. The organism grew in Sauton medium, forming a thick orange pellicle and producing turbidity of the medium and colouring it orange. It grew best at room temperature and at the end of four months the pH was 7·4; it gave a negative xanthoprotein reaction, and a filtrate from the culture failed to provoke a reaction in tuberculous g. pigs. The organism was non-pathogenic.

At the end of a year's growth the medium was very turbid and there was an abundant orange deposit. The pH was in the region of 6 and the xanthoprotein reaction was positive. The medium gave off an odour of tuberculin. A filtrate was accordingly prepared from the culture on the lines of tuberculin. Twenty-one tuberculous g. pigs were inoculated with the filtrate. Ten gave reactions as strong as those obtained with 1 : 10 tuberculin and four of the reactions became necrotic. In ten others the reaction was not as intense as with tuberculin. In only one was there no reaction, although the animal reacted to tuberculin. D. points out the significance of this finding.—D. L. Hughes.

Choucroun, Nine. (1939). Sur un antigène sensibilisant extrait due bacille tuberculeux. [**A Sensitizing Antigen from** *Mycobacterium tuberculosis*]. — *C. R. Acad. Sci., Paris.* **208.** 1757–1759. [2 refs.]

Liquid paraffin, when incubated with dead human and bovine tubercle bacilli and subsequently centrifuged to remove bacterial debris, extracts an active antigen which precipitates antibodies in the sera of tuberculous animals. Inoculation of these oily extracts induces antibody formation in rabbits and a marked sensitivity to the subsequent injection of tuberculin in healthy g. pigs.—A. Eden.

Rouslacroix, A., Brahic-Veyron, J., & Campana. (1940). Étude comparée des réactions cutanées à la tuberculine et à l'histamine en différents points des téguments. [**Comparative Study of Cutaneous Reactions to Tuberculin and Histamine at Different Points of the Epidermis**].—*C. R. Soc. Biol. Paris.* 133. 144–146. [2 refs.]

It is known that in children suffering from enlarged tuberculous tracheo-bronchial glands there is a difference in sensitivity of various parts of the body to tuberculin. The most intense reactions are obtained on the surface of the chest and the abdomen, and the reactions become less intense on the arms, the shoulders, the legs, and the feet. This suggested to the authors that the intensity of the reaction depends on the location of the lesion and the power of the capillaries in the area to react. Studies were made in healthy and tuberculous subjects. The inoculations were made in the deltoid region, the first intercostal space, and over the area corresponding to the summit of the lung in human beings. The cutaneous tuberculin reaction was performed first and when all reaction had subsided after about

12 days an intradermal injection of histamine was given at the same site.

The results between the different sites and between the reactions to tuberculin and histamine varied considerably. The table giving the results cannot be summarized and should be consulted in the original.—D. L. HUGHES.

VAN DEINSE, F., SCHWARTZ, R., & SOLOMIDES, J. (1939). Réactions hyperergiques d'épreuve chez des lapins sensibilisés par des bacilles tuberculeux morts ou avirulents. "Toxicité" du bacille aviaire. **[Experimental Hyperergic Reactions in Rabbits Sensitized by Dead or Avirulent Tubercle Bacilli. "Toxicity" of the Avian Bacillus].**—*Ann. Inst. Pasteur.* **63.** 443–454. [Numerous refs.] [Translation of authors' summary].

In spite of the reduced activity of the tuberculin they produce, certain cultures of the avian type tubercle bacillus appear to possess a greater "toxic" power than cultures of mammalian bacilli. Rabbits rendered allergic are particularly sensitive to the toxic effects of the protein of avian type bacilli.

No shock nor fatal hyperergy could be induced in rabbits given repeated injections of BCG followed after an interval by intravenous injection of a single large dose.

WILSON, G. S., SCHWABACHER, Herta, & MAIER, Irene. (1940). **The Effect of the Desensitisation of Tuberculous Guinea Pigs.**—*J. Path. Bact.* **50.** 89–109. 7 tables. [Numerous refs.]

A description is given of a series of experiments undertaken to find out the effect of large doses of tuberculin, given either before or after infection, on the progress of experimental TB. in sensitized and control g. pigs. Proof is afforded to show that those animals rendered allergic by vaccination with heat-killed tubercle bacilli, desensitized by large doses of tuberculin, infected intramuscularly with very small doses of virulent tubercle bacilli, or kept more or less desensitized by large doses of tuberculin after infection, survived longer and had fewer lesions P.M. than allergic non-desensitized animals. Continuous desensitization after infection appeared to limit the progress of the disease, but some doubt was felt as to whether tuberculin treatment before infection was of any value. It is suggested that desensitization with tuberculin acts, not by abolishing allergy, but by converting a high into a low degree of allergy. The repeated doses of tuberculin set up inflammatory reactions around each tuberculous focus in the body, and these tend to retard dissemination of the tubercle bacilli and to prevent the rapid and destructive caseation which seems more liable to occur in highly hypersensitive animals. The authors affirm that allergy and immunity are related phenomena and that allergy, when controlled, constitutes a very valuable mechanism in the defence of the body against the invasion of the tubercle bacillus.—J. R. LAWSON.

CASALS, J., & FREUND, J. (1939). **Sensitization and Antibody Formation in Monkeys Injected with Tubercle Bacilli in Paraffin Oil.**—*J. Immunol.* **36.** 399–404. 1 fig. [7 refs.] [Authors' summary copied *verbatim*].

Antibody-formation and scant sensitization to tuberculin can be produced in the Macacus rhesus monkey by heat-killed tubercle bacilli. This antigen when suspended in paraffin oil induces abundant antibody-formation and intense and lasting sensitization.

NAGEL, A. (1939). Ueber die Bedeutung der Antikörper bei der Tuberkulose und den Wert der serologischen Untersuchungsmethoden, unter besonderer Berücksichtigung der experimentellen Meerschweinchentuberkulose. **[Importance of Antibodies in Tuberculosis and the Value of Serological Diagnostic Methods in Guinea Pigs].**—*Zbl. Bakt. I.* (*Orig.*). **144.** 357–365. 4 tables. [8 refs.]

Results in 102 experiments on g. pigs were disappointing. In spite of improved antigens, responses were not sufficiently specific either in complement-fixation or flocculation reactions. Of 21 cases of actively progressing infection complement-fixing antibodies were only detected in three. Good serological reactions were also no indication of immunity, and pronounced development of complement-fixing bodies by injections of massive doses of killed organisms in liquid paraffin did not delay development of TB. after subsequent inoculation with small doses of live organisms.

—H. H. GREEN.

HINDMARSH, W. L. (1940). **The Standardization and Interpretation of the Agglutination Test for Brucella Infection in Cattle.**—*Aust. vet. J.* **16.** 20–26. [15 refs.]

H. briefly reviews the literature relating to this subject and advocates the adoption of a

standardized antigen and technique for use throughout Australia. It would be an advantage if all the antigen were prepared in a central laboratory and each batch tested against a standard positive serum kept in the dried state. —W. I. B. Beveridge.

Nagler, F. P. O. (1939). **Observations on a Reaction Between the Lethal Toxin of *Cl. welchii* (Type A) and Human Serum.** —*Brit. J. exp. Path.* **20.** 473–485. 2 figs., 11 tables.

A phenomenon is described in which human serum, inoculated with *Clostridium welchii* (Type A) and incubated anaerobically for 16 hours, becomes opalescent. and when centrifuged separates out into a bottom layer of bacilli, a middle layer of opalescent serum, and a top layer of a fat-like material. This change in the human serum was shown to be caused by the toxin of *Cl. welchii* (Type A) and to be specifically inhibited by the corresponding antitoxin. The reaction was also observed when any of the four types of *Cl. welchii* was cultured in a mixture of human serum and broth. Titration of *Cl. welchii* (Type A) toxin by means of the reaction showed that the activity of the toxin in altering human serum was correlated with its toxicity for mice. Titration of *Cl. welchii* (Type A) antitoxin by means of the reaction showed that the potency of the antitoxin in inhibiting the alteration of human serum by toxin *in vitro* corresponded with its neutralizing action *in vivo*. The reaction could therefore be used for the standardization of both *Cl. welchii* (Type A) toxin and antitoxin.—R. O. Muir.

Grabar, P., Levenson, S., & Schneierson, S. S. (1940). Étude expérimentale des toxines du *B. perfringens* types A et C au moyen de l'ultrafiltration fractionnée. **[Study of A and C *Clostridium welchii* Toxins by Fractionated Ultra-Filtrates].** —*Ann. Inst. Pasteur.* **64.** 275–292. 5 tables. [Numerous refs.]

The supernatants from centrifuged 24 hour broth cultures (Weinberg and Goy's medium) of *Cl. welchii* Types A and C were saturated with $(NH_4)_2SO_4$ and the precipitated toxins passed through filter paper. Samples of the toxins, unconcentrated or concentrated by precipitation and solution in a volume of physiological saline to one-tenth of the initial volume of broth, were filtered through "gradacol" membranes under positive pressure of nitrogen varying with the pore size. Initial solutions of toxin, obtained by filtration through membranes with a pore size of 1,760 mμ and 460–500 mμ, were passed in volumes of 5–10 c.c. through a series of membranes of decreasing pore size. The titration of the haemolytic power of each filtrate was made according to Weinberg and Guillaumie's technique and the titration of toxic power by intravenous injection of mice.

The terminal point of filtration of the haemolytic factors of both Type A and Type C toxins was about 23 mμ, corresponding to a molecular size of 7–9 mμ. The haemolytic factor of Type A toxin could not be separated by ultrafiltration from the non-haemolytic purely toxic factor, although haemolysin-free filtrates possibly contained a quantity of purely toxic factor which was too small to kill a mouse. The purely toxic factor of Type C toxin was separable by ultrafiltration from the haemolytic factor, although the end point of filtration of the toxic factor was not reached. The fact that it was passed by a membrane of pore size 5–9 mμ suggested that its molecules were similar in size to those of egg albumin or probably smaller.—R. O. Muir.

Lahiri, D. C. (1940). **Studies on Relationship of Flocculation Value of Tetanus-Formol-Toxoid determined by Ramon's Method and its Antigenic Value determined on Experimental Animals.** —*Indian J. med. Res.* **27.** 651–656. 2 tables. [6 refs.] [Authors' summary copied *verbatim*].

Flocculation values of different tetanus-formol-toxoids were determined against a special serum prepared by Ramon. Toxoids of different flocculation values were used for immunizing guinea-pigs, and their antitoxic responses were measured in terms of antitoxin unit content per c.c. of circulating blood. It was found that antitoxin response after injection of a toxoid did not always closely correspond with its flocculation value. The possible cause of this variation is discussed.

Prévot, A. R., & Boorsma, H. J. (1939). Répartition de l'azote et métabolisme axoté dans la toxinogenèse tétanique. **[Role of Nitrogen in Toxin Formation by *Clostridium tetani*].** —*Ann. Inst. Pasteur.* **63.** 600–610. 2 tables, 3 graphs. [7 refs.] [Translation of authors' summary].

Toxin formation by *Cl. tetani* depends mainly upon the equilibrium of the nitrogenous con-

stituents of the media, a relationship dependent upon the stage of polypetide digestion. The toxin titre varies in proportion to the ratio $\frac{\text{COOH polypetides}}{\text{COOH total}}$ according to the method of Martens. The vitamin content of the media also influences toxin formation. Insufficiency of either of these factors may be improved by the addition of organic extracts or of synthetic preparations of vitamins B_1, B_2, and the P.P. factor. These substances raise the toxin titre above normal, even when high toxin formation is already occurring.

OXER, D. T. (1940). **Observations on the Antigenicity of Alum-Precipitated *Cl. botulinum* Type C Toxoid.**—*Aust. vet. J.* **16.** 4–13. 2 figs., 10 tables. [5 refs.]

Heavy mortality of sheep in Western Australia is caused by botulism, and it has been found that vaccination is effective in preventing losses. The vaccine used in the field has been a formalinized Type C culture with 0·6% potassium alum added, given in two doses. O. now reports an investigation into the preparation of a satisfactory vaccine.

Potassium alum was added to formalinized culture in concentrations of 0·5, 1·0 and 2·0%, with variations of pH from 5·5–7·4. The antigenicity of the supernatant fluid and the precipitate from each preparation was then determined by immunizing groups of g. pigs and estimating the antitoxic content of their sera by toxin neutralization tests in mice. Although the precipitate was a more potent antigen than the supernatant fluid, the latter retained considerable antigenicity and, furthermore, untreated toxoid possessed about the same potency as the precipitate. The resistance of the immunized g. pigs was comparable to the antitoxic titre of their sera.

Sheep were immunized with one or with two doses of alum-toxoid and their antitoxic response determined over 15 weeks. An initial dose of 1 ml. followed six weeks later by 5 ml. gave a much better response than one dose of 5 ml., but after 15 weeks the antitoxic titre was much the same in both groups. These sheep were then inoculated with from 500–2,000 sheep lethal doses of *Clostridium botulinum* toxin. None developed symptoms or died. Sera obtained from sheep vaccinated in the field with two doses of alum-toxoid up to 20 months previously still showed antitoxin of about the same order as the experimental sheep described above.

It is concluded that *Cl. botulinum* Type C toxin, toxoided with formalin and with 0·6% potassium alum added (the routine vaccine which has been used in the field), is a very efficient antigen and that one dose of 5 ml. repeated every two years should give ample protection against the disease in the field.

—W. I. B. BEVERIDGE.

WILLISON, G. W. (1939). **The Effects of Bacterial Toxins on Erythrogenesis. A Study of the Peripheral Blood Picture in Rabbits Made Anemic by Chronic Hemorrhage.**—*J. Lab. clin. Med.* **24.** 883–894. 1 table, 6 charts. [10 refs.]

The red blood corpuscle, white cell, and reticulocyte counts were determined repeatedly in adult rabbits receiving a stock diet. The animals were then rendered anaemic by frequent bleedings, and were injected with varying doses of one of the following bacterial products: a filtrable haemolytic toxin of *Staphylococcus aureus*, tetanus toxin, diphtheria toxin and toxoid, and a haemolytic toxin of a strain of *Streptococcus scarlatinae* [*pyogenes*]. The *Staph. aureus* was given intramuscularly and the others subcutaneously.

Lethal doses of tetanus toxin produced a fall in reticulocyte production during the survival period, but sublethal doses caused only transient changes in the peripheral blood. Animals which died showed a hyperplasia of the red bone marrow. A fall in reticulocytosis followed the administration of both lethal and sublethal doses of all the other toxins employed, but in an animal which died following repeated injections of diphtheria toxoid, there was no significant change in the reticulocyte picture.

There was no evidence of an increased r.b.c. destruction, and W. concludes that the toxins must have acted upon erythropoietic tissues of the bone marrow.—ALASTAIR N. WORDEN.

ASCOLI, A. (1938). Die Anachorese. Ein biologischer Vorgang. **[Anachoresis].** pp. 165. 1 fig., numerous tables, 13 graphs. Milan: Istituto Vaccinogeno Antitubercolare. [4to]. [In German: English, French and Italian summaries].

This is a collection of twelve articles on anachoresis [see *V. B.* **2.** 266.] by Ascoli and his co-workers, reprinted in German from various Italian journals dating from 1928 to 1935 in order that it may be read by those to whom the originals may not be accessible.

The author's theory of anachoresis is that the

inflammatory foci or fixation abscesses resulting from vaccination with BCG act as centres of attraction and destruction for other pathogenic bacteria. He has applied this theory to the treatment of pasteurella and streptococcal infections, glanders, actinomycosis and foot and mouth disease, and claims success in each case.

GARIPUY, A. (1939). Réactions pulmonaires dans l'anaphylaxie. **[Pulmonary Reactions in Anaphylaxis].**—*Ann. Inst. Pasteur.* **63.** 190–212. 4 figs. [Numerous refs.] [Translation of author's summary].

Studies on the pulmonary reactions of the rabbit in experimental anaphylaxis produced by up to ten " déchainantes." inoculations (endotracheal, intravenous, subcutaneous, and intraperitoneal), revealed persistent lesions, whereas with shock produced by a single " déchainante " dose only transient changes occurred.

The persistent lesions are mesenchymatous (vascularity and mobilization of the fixed elements of connective tissue) and similar to those produced by immunization or protein intoxication. They are apparently produced by local neutralization of the injected antigen, and also by the formation of substances such as antibodies.

These anatomical changes, although they have no aetiological specificity, may be justly described as " anaphylactic inflammation ".

KARADY, S. (1939). **Rôle of "Auto-Antigens" in the Pathogenesis of Physical Allergy.**—*J. Immunol.* **37.** 457–461. [3 refs.]

Two groups of seven g. pigs showed symptoms of anaphylactic shock after receiving a second injection, three weeks after an initial injection, of normal g. pig serum which had been exposed to –5°C. or 56°C. for 1½ min. No shock resulted in g. pigs when the second injection was of serum exposed to the opposite physical condition to the first. Similar results were obtained when two groups of ten g. pigs were injected with cold or heat-treated serum three weeks after exposure of their hind limbs to cold or heat, and when the hind limbs of two groups of 12 g. pigs were re-exposed to cold or heat three weeks after the first exposure. K. explains his results on the assumption that an organism's own protein may acquire antigenic properties for that organism by alteration due to physical agents such as heat and cold.

—R. O. MUIR.

PEYRON, A., STAUB, A., & POUMEAU-DELILLE, G. (1939). Comparaison chez les animaux neufs et immunisés des réactions histiocytaires dans les lésions expérimentales provoquées par le charbon bactéridien. **[The Histological Reactions Provoked by *Bacillus anthracis* in Normal and Immunized Animals].**—*C. R. Acad. Sci., Paris.* **208.** 1762–1764. 1 fig. [1 ref.]

A histological study was made of the dermal reaction to an intracutaneous injection of anthrax spores of 12 control rabbits and 18 rabbits immunized by subcutaneous inoculation with alum-agar anthrax vaccine. Intravital staining with trypanblue showed that there occurred in the vaccinated rabbits a mixed fibroblastic and histiocytic reaction characterized by perivascular cuffing with monocytes.

—R. O. MUIR.

VALLÉE, H. (1939). Sur les facteurs adjuvants de la vaccination. **[Adjuvant Factors in Vaccination].**—*C. R. Acad. Sci., Paris.* **208.** 1125–1127. [3 refs.]

Comparison of the immunity produced in groups of ten g. pigs by *Clostridium chauvoei* vaccine, unaltered, neutralized, washed or without sediment, showed that best protection was given by vaccine which retained its normal acid reaction and insoluble constituents.

—R. O. MUIR.

MCKEE, Clara M. (1939). **Immunization against Infectious Myxomatosis with Heat-Inactivated Virus in Conjunction with the Type III Pneumococcus.**—*Amer. J. Hyg.* Sect. B. **29.** 165–170. 3 tables. [7 refs.] [Author's summary copied *verbatim*].

Heat-inactivated virus of infectious myxomatosis of rabbits produces slight resistance to infection but, when it is injected together with living type III pneumococci, a more potent immunity apparently results. Twenty-five out of 38 rabbits (65·8 per cent) so treated have survived the injection of an active virus filtrate. Forty-six per cent of those that succumbed to the infection showed an increased survival time over normal rabbits.

There is a positive correlation between the complement-fixing antibody content of the sera and the degree of resistance to infection in the immunized rabbits.

SMITH, E. C. (1940). **Yellow Fever Immune Bodies in Sheep Sera.**—*Trans. R. Soc.*

trop. Med. Hyg. **34.** 97–104. 2 tables. [7 refs.]

One hundred samples of serum from Nigerian sheep were tested against yellow fever virus for the presence of antibodies: 53 were negative and 15 were doubtful, while 32 gave partial or complete protection.

A neurotropic strain of the virus [? mouse origin] was inoculated intracerebrally into two sheep, one of which was killed at the fourth day. Material from its brain was passed to two more sheep and serial passages were continued to the fourth generation. The presence of the virus was detected by intracerebral inoculation of mice. [Full details of the mouse experiments are not given.] The possible role of sheep as carriers of yellow fever virus is discussed.—R. E. Glover.

I. Evans, D. G., & Maitland, H. B. (1939). **The Toxin of *Br. bronchiseptica* and the Relationship of this Organism to *H. pertussis*.**—*J. Path. Bact.* **48.** 67–78. 5 tables. [18 refs.]

II. Bruckner, I. E., & Evans, D. G. (1939). **The Toxin of *B. parapertussis* and the Relationship of this Organism to *H. pertussis* and *Br. bronchiseptica*.**—*Ibid.* **49.** 563–570. 4 figs. on 1 plate, 4 tables. [6 refs.]

I. Details are given of the preparation, titration in g. pigs and rabbits, filtrability, reaction to heat and formalin, and the antigenic properties of the toxin of *Brucella bronchiseptica*. The Bordet-Gengou medium proved most favourable for toxin production. The toxin of *Br. bronchiseptica* was shown to be very similar in properties and potency to that of *Haemophilus pertussis* and intravenous or intradermal injection of either toxin produced identical lesions similar to those caused by the live bacilli. The antigenic relationship between the two organisms was demonstrated by serological methods, and agglutination and agglutinin-absorption tests showed that they possessed a large amount of specific antigen and a small amount of common antigen, both of them somatic.

II. A description is given of the preparation and properties of the toxin of "*B. parapertussis*", an organism isolated from cases of whooping cough and shown by cultural methods to be very closely related to both *H. pertussis* and *Br. bronchiseptica*. The properties of its toxin were very similar to those of the toxins of *H. pertussis* and *Br. bronchiseptica*, although its potency was less. The close antigenic relationship of all three organisms was established by agglutination, complement-fixation and precipitation tests. Experimental infection of mice showed that they possessed similar pathogenic properties. The authors consider that their findings justify a re-classification of the three organisms.—R. O. Muir.

Pope, C. G. (1938). **Disaggregation of Proteins by Enzymes.**—*Brit. J. exp. Path.* **19.** 245–251. 3 tables. [4 refs.]

I. A report is given of the action of fibrolysin on the diphtheria antitoxic pseudoglobulin molecule which, as a result of the enzyme action, becomes disaggregated into two protein components having different physical and chemical properties. Using this property of the enzyme, a method of critical differential heat denaturation was worked out for obtaining antitoxins of greater purity.

This specific action is not limited to fibrolysin but appears to be a property of all the proteolytic enzymes provided they are used under correct conditions; the action of the enzymes must be limited so that no hydrolysis or digestion takes place because, if real hydrolysis occurs, differential denaturation fails, as it is no longer possible to remove the inactive non-antitoxic protein by fractional heat-coagulation methods.—R. Allcroft.

I & II. Pope, C. G. (1939). **The Action of Proteolytic Enzymes of the Antitoxins and Proteins in Immune Sera. I.—True Digestion of the Proteins. II.—Heat Denaturation after Partial Enzyme Action.**—*Brit. J. exp. Path.* **20.** 132–149 and 201–212. 2 figs., 25 tables. [19 refs.]

I. Results are given showing the conditions under which certain proteolytic enzymes (pepsin, trypsin, papain) cause true digestion of the proteins present in antitoxic sera and thus increase the purity of the antitoxin. The true digestion of protein is defined as "its conversion into a form no longer coagulable by heat at the isoelectric point of the protein (in the presence of suitable electrolyte)". The destruction of antitoxin which takes place as a result of digestion was measured, and the conditions determined which allowed a removal of protein by digestion without a corresponding destruction of antitoxin. Observations on the effect of temperature, pH, protein concentration and ratio of enzyme to protein are given. Results obtained from a study of the plasma

from individual horses show that antitoxin stability and protein digestion vary greatly, and unpredictable antitoxin losses occur. Generally serum from horses which have immunized rapidly to high titre give the best results with a simple digestion method. It is concluded that this method of true digestion by means of enzymes offers little advantage over salting methods unless it is followed by the use of adsorption procedures for the further removal of inert proteins.

II. The results reported in this paper support P.'s earlier view [see preceding abst.] that in its normal form, as it exists in horse serum, the antitoxic globulin consists of a complex molecule which is easily disaggregated by certain enzymes into two portions. One of these is non-antitoxic and readily denatured in acid solutions, the other portion carries the antitoxic activity and is far less readily denatured.

Details are given of a method for the purification and concentration of antitoxic sera. After very limited enzyme action on the antitoxic protein, the non-antitoxic portion is removed from solution by critical heat denaturation and the antitoxin which remains in solution is then salted out with ammonium sulphate.—R. A.

DISEASES, GENERAL

SHAHI, H. B. (1937). **A Brief Note on the More Recently Discovered Canine Disorders in India.**—*Proc. Anim. Husb. Res. Wkrs Conf. India, 1936.* pp. 74–80. Discussion pp. 81–82. 3 tables.

The conditions referred to are those affecting dogs imported into India; losses in such dogs are serious and the causation is obscure. One case showed amoebic cysts, but these were not found in subsequent cases; treatment for amoebic dysentry had no effect. Some cases showed infection with *Babesia canis* or *B. gibsoni* and one had lesions of generalized tuberculosis. COOPER obtained negative results with salmonella antigens against the serum of infected dogs, with one exception. From three of four cases an organism resembling *S. enteriditis* was isolated, but with varying biochemical and agglutination reactions. Its role as an aetiological factor could not be substantiated, owing to negative reactions against serum of the affected animals.

Reference is made to a pasteurella organism from fatal cases and to a coliform organism derived from such cases. Details are given of some of the reactions of these two organisms. Some details are given of a small trial with a polyvalent vaccine which incorporated both organisms.—J. A. GRIFFITHS.

GUTHRIE, W. J. (1940). **Grass Sickness in Horses.**—*J. R. agric. Soc.* **100.** Pt. III. 50–59. 4 figs.

The article is a general survey of grass sickness of horses. Details are given concerning the incidence in separate counties in England. The information relating to Cheshire—" the disease has been remarkably rare; only three definite cases have been reported " is cryptic.

The incidence in Scotland is stated to be 2–4% of the horse population annually, but no details are given as to the basis on which this estimate was made. There is some discussion concerning etiology, but no new information is provided.—W. A. P.

DUKALOV, I. A. (1940). Predrodovoĭ parez ovtsematok. **[Prenatal Paresis in Ewes].** —*Sovyet. Vet.* No. 1. pp. 46–48. [3 refs.]

This disease more frequently affects ewes carrying two or more lambs and is mostly observed 10–15 days before parturition. D. considers that it is possibly analogous with eclampsia in human beings which has been attributed to an adrenal cortex insufficiency with attendant disturbance of the carbohydrate metabolism. D. made therapeutical experiments on ewes with " cortin " (a commercial adrenal cortex preparation), with beet sugar and ethyl alcohol. " Cortin " was given to 12 seriously affected ewes, six of which recovered on the third day after administration while the other six showed signs of improvement but were killed, the reason for this not being stated. Ethyl alcohol (30%) was given intravenously to 30 affected ewes in doses of 15–30 g. It is stated that 16 ewes recovered sufficiently within 24 hours to be turned out to graze with the rest of the flock. No definite results were obtained with beet sugar.—E. MARTIN.

IYER, S. G. (1939). **Visceral Gout of Fowls in India.**—*Indian J. vet. Sci.* **9.** 375–376. [2 refs.]

An account of the clinical, pathological, and aetiological aspects of visceral gout as seen in fowls in India.—G. C. BRANDER.

DOBRINER, K., & RHOADS, C. P. (1940). **The Porphyrins in Health and Disease.** See PHYSIOLOGY, p. 193.

STASNEY, J., FELDMAN, W. H., & POPP, W. C. (1939). **Experiments in Homologous Transmission of Lymphoblastic Leukemia in a Calf.**—*Amer. J. Cancer.* **37.** 114–117. [8 refs.] [Author's summary copied *verbatim*].

Attempts were made to transmit lymphoblastic leukemia of a calf to two other calves of the same breed. Blood and emulsions prepared from hyperplastic lymph nodes of the diseased calf were injected into the recipients both intravenously and subcutaneously. The spleen of one recipient was irradiated with a large dose of roentgen rays prior to injection. Numerous hematologic studies were made of both calves during the period of the experiment, but except for a transitory but marked leukocytosis that subsided ten days after the animals had received the injections, significant changes in the blood were not observed. One of the calves was under observation for 283 days and the other for 346 days after receiving the inocula from the diseased animal. Subsequent histologic studies showed both to be essentially normal.

SCHERER, H. J. (1940). **Degeneration of the Papillo-Macular Bundle in Apes and its Significance in Human Neuro-Pathology.**—*J. Neurol. Psychiat.* **3.** 37–48. 8 figs. [Numerous refs.] [Author's summary copied *verbatim*].

A spontaneous systemic degeneration of the papillo-macular bundle is frequently found in captive monkeys dying from different general diseases. In routine optic nerve examinations it has been observed in 8 out of 27 cases; most of these were of recent onset.

The optic nerve lesions which accompany most cases of spontaneous "encephalosis" and "myelosis" in monkeys (cerebral and spinal form of subacute combined degeneration), are also systemic degenerations of the papillo-macular bundle. They may be complicated by the appearance in the peripheral optic pathways of the same circumscribed, later confluent, patches of demyelinization which characterize the disease in the spinal cord and centrum ovale.

The frequency of the optic lesion and its often terminal character in different general diseases (generalized tuberculosis, gastro-intestinal troubles, cachexia, meningitis, etc.) suggests that its origin may be in a nutritional deficiency, and that this may also account for the lesions of subacute combined [degeneration] in monkeys. Our actual knowledge of human papillo-macular bundle degeneration seems to support this hypothesis.

JUNGHERR, E., & WOLF, A. (1939). **Gliomas in Animals. A Report of Two Astrocytomas in the Common Fowl.**—*Amer. J. Cancer.* **37.** 493–509. 4 figs., 1 table. [Numerous refs.]

This paper includes a comprehensive review of gliomas previously recorded in animals, with a critical discussion of individual cases and suggestions as to the probable exact classification of tumours which were reported under a variety of different names.

Two astrocytomas are described in fowls, one involving the cerebrum and cerebellum, the other being confined to the cerebrum. Both tumours were multiple and portions projected into the lateral ventricles. Three cases of glioma have been previously described in the fowl and these are considered by the authors as astrocytomas although not designated as such by the original authors; it is considered probable, therefore, that all five cases of glioma described in fowls have been astrocytomas. The tumours, unlike those in man, were lobulated.

One of the fowl tumours described in the paper may have been familial in its occurrence since birds of the same inbred strain showed similar symptoms throughout several generations. The strain was unfortunately allowed to die out.—E. G. WHITE.

FALIN, L. I. (1940). **Experimental Teratoma Testis in the Fowl.**—*Amer. J. Cancer.* **38.** 199–211. 14 figs., 1 table. [Numerous refs.]

Experimental teratoma of the testis in the fowl was first produced in 1925 by injection of 5% zinc chloride. Up to the present time 23 similar tumours have been produced and the author has described 13 from the laboratory at Smolensk (U.S.S.R.). Three of the tumours were produced by injection of zinc sulphate.

Derivatives of all three germ layers are represented. The mesenchyme produces hyaline cartilage, often replaced by endochondral bone. There are acini lined by columnar epithelium and goblet cells, sometimes with areas of squamous epithelium within the same acinus. There are structures suggestive of

bronchi and embryonic intestine, and feather anlagen are well developed. Nervous elements present include medullary tubes, neuroblasts, nerve cells, neuroglia, and medullated and non-medullated nerve fibres.

The tumours develop during resorption of the foci of necrosis produced by the injection; the products of cell autolysis are considered to play a part which is perhaps similar to that of the evocators in normal embryonic development. The author suggests that the tumours arise from primary genital cells—gonocytes—rather than from spermatogonia. The gonocytes for the most part develop into testis cells, but some may remain undeveloped and give rise to spontaneous or experimental teratomas.

—E. G. White.

Foulds, L. (1940). **The Histological Analysis of Tumours. A Critical Review.**—*Amer. J. Cancer.* **39.** 1–24. [Numerous refs.]

This is a comprehensive review of the results of histological examination of spontaneous and experimentally produced tumours in so far as they contribute to our knowledge of the properties of tumours and the laws to which they conform. It is not possible to do justice in an abstract to this excellent paper which refers to 122 papers published by workers in all parts of the world.

Particular reference is made to the normal development of bone and to its formation in tumours and in abnormal situations.

The types of histological differentiation found in tumours are inherent in the parent tissues; some occur commonly, and others are rare. Recent work has shown that a greater capacity for divergence of differentiation is possessed by normal adult cells than was previously realized. In some tumours the main or sole line of differentiation is an exceptional one. Tumours arising from the same tissue may thus differ widely, whereas those from different tissues may be very similar. Sarcoma cells apparently cannot be induced to form bone unless they are permanently biased to do so, the capacity to form bone being less easily evoked than in normal connective tissue cells.

The parenchyma cells of any tumour possess permanent characteristics which are transmitted to their descendants and which are able to evoke the formation of a stroma and to determine its qualities. This explains the close resemblance between primary and secondary tumours.

F. considers that embryology has been too often invoked to explain the origin of complex neoplasms, *e.g.* teratoma of the testis has been produced in fowls by the injection of zinc chloride into the testis [see preceding abstract], whilst embryonic and malignant seminomas have been produced as a result of almost complete removal of the testis in the same species.

There is abundant evidence that tumours consist of cells permanently altered from the normal, the process of conversion of normal cells into neoplastic cells being irreversible.

—E. G. White.

Nieberle, K. (1939). Ueber endemischen Krebs im Siebbein von Schafen. **[Endemic Cancer in the Ethmoid Bone of Sheep].**—*Z. Krebsforsch.* **49.** 137–141. 3 figs.

Endemic cancer of the ethmoid has been previously described in Sweden in cattle and horses, but there is no record of its occurrence in sheep. K. describes 12 cases of carcinomatosis of the ethmoid arising from the olfactory mucosa in a flock of Hampshire sheep. The symptoms were anorexia, snuffling respiration, lachrymation, and conjunctivitis. The shepherd stated that the condition had occurred annually for several years past. The tumours were adenocarcinomata and had invaded the nasal cavity, pharynx, and frontal sinus and had penetrated the lamina cribrosa forming a mass of tumour tissue within the cranium, but without invasion of the meninges. There were no metastases.

Parasites were excluded as a possible cause of the condition. Inbreeding within the flock was a possible contributory factor in the high incidence, but K. suggests the condition was more probably related to the effect of arsenic dust in the atmosphere in the area concerned (Freiberg). Arsenic poisoning in cattle from neighbouring industrial plant is not uncommon. Some support was provided for this view by a chemical analysis of the tumours and organs of an affected sheep, the liver containing 0·1 mg. As per kg. and the brain and tumour a considerably smaller quantity.—E. G. White.

I. Andervont, H. B. (1938). **Susceptibility of Mice to Spontaneous, Induced, and Transplantable Tumors. A Comparative Study of Eight Strains.**—*Publ. Hlth Rep., Wash.* **53.** 1647–1665. 6 tables. [Numerous refs.] [Author's summary copied *verbatim*].

II. Andervont, H. B. (1938). **The Incidence of Induced Subcutaneous and Pulmonary Tumors and Spontaneous Mammary Tumors in Hybrid Mice.**—*Ibid.* 1665–1671. 2 tables. [12 refs.] [Author's summary copied *verbatim*].

I. Eight strains of highly inbred mice have been used in these investigations. In these strains the incidence of spontaneous mammary tumors in the breeding females varies from less than 5·0 percent to practically 100 percent, according to strain. Each strain has been tested for susceptibility to the induction of subcutaneous and pulmonary tumors by subcutaneous injection of lard solutions of carcinogenic hydrocarbons. Wide variations in susceptibility to both types of induced growths were encountered in the different strains. Those strains which develop pulmonary tumors spontaneously were found to be the most susceptible to induced lung tumors. The response of those strains which develop lung tumors spontaneously when injected with hydrocarbons may be compared with the response of high mammary tumor strains when subjected to treatment with estrin. There is no correlation between the susceptibility to spontaneous mammary tumors and susceptibility to the induction of subcutaneous growths.

The strains also vary in their susceptibility to the cutaneous growth of transplantable tumors; but, here again, there is no correlation between the susceptibility to spontaneous tumors and susceptibility to propagable growths.

It is believed that generalization should not be made from the results attending these studies. The induced tumors were evoked only by 1 : 2 : 5 : 6-dibenzanthracene or methylcholanthrene, and the response of the strains to transplantable mouse tumors applies only to the growth of sarcoma 37 and sarcoma 180.

The studies yield information concerning the characteristics of the strains of mice which should be of assistance in the selection of a suitable strain for certain experimental purposes. Since in these strains there is no correlation between the susceptibility to the induction of subcutaneous tumors and the natural resistance to the growth of transplantable tumors or the development of spontaneous mammary tumors, the conclusion may be drawn from the investigations that, up to the present time, a strain of mice has not been found which is resistant or susceptible to all types of tumor growth.

II. Reciprocal breeding was carried on between mice of strains C_3H and I and strains C_3H and Y. The female parent mice and most of the hybrid mice were injected subcutaneously with a lard-dibenzanthracene solution. The results of the investigation may be summarized as follows :– (1) The C_3H female parents were more susceptible to the carcinogen than either the I or Y female parents. (2) The hybrid mice were of intermediate susceptibility when compared with the susceptibility of the parent strains. (3) Hybrid mice derived by mating strain C_3H to strain I were considerably more susceptible to induced pulmonary tumors than those derived by mating strain C_3H to strain Y. (4) Female hybrids born to C_3H mothers and I fathers were more susceptible to spontaneous mammary cancer than female hybrids born to C_3H mothers and Y fathers.

Symeonidis, A. (1939). Experimentelle und morphologische Untersuchungen zur Tumorimmunität I. Immunisierungsversuche. II. Die mikroskopischen Erscheinungen und das Wesen des Tumorimmunitätsvorganges an der Impfstelle. [**Experimental and Morphological Investigations into Tumour Immunity. I. Experiments with Immunization. II. Microscopic Processes and the Character of Tumour Immunity on the Site of Inoculation**]. —*Virchows Arch.* **304.** 115–139 and 271–295. 15 figs. [Numerous refs.]

S. made numerous attempts to procure immunity in mice against an Ehrlich carcinoma and an Ehrlich sarcoma, both of which could be relied on to effect 100 % of " takes " in mice.

For non-specific immunization, embryonic tissue and placental tissue from mice were injected and followed by the infective tumour dose. In no case was absolute immunity conferred, but relative immunity was produced by embryonic tissue, especially in a few cases in which the tissue gave rise to an " embryoma " at the site of infection. Placental tissue conferred a weak relative immunity in a few cases only.

Tests with normal tissues (liver, spleen, lung, and kidney) from adult mice, showed that liver and spleen conferred a relative immunity, lung no immunity, whilst kidney appeared to stimulate the tumour growth.

Attempts to produce immunity by another tumour (a haemorrhagic adenocarcinoma from the mammary glands of mice), resulted in

absolute immunity in a few cases against the Ehrlich carcinoma, but only a relative immunity against the Ehrlich sarcoma.

Homologous, cold-extracted tumour filtrate readily conferred relative immunity (absolute immunity in one case), whilst the intradermal injection of very small doses of homologous tumour tissue proved to be valueless in protecting against subcutaneous injection : on the contrary the method was apt to set up the tumour growth itself.

By repeated massage and squeezing of bean-sized Ehrlich carcinomas, it was found possible to bring about the disappearance of the growth, which process resulted in absolute immunity against reinoculation, but with the sarcoma the result was to effect rapid metastasis and to hasten ultimate death.

In two out of 60 cases it was possible to confer absolute immunity against the Ehrlich carcinoma by 3–6 injections of diluted homologous tumour tissue, but the dose factor was all-important, as 56 mice contracted the growth by this treatment. The Ehrlich sarcoma was too virulent to allow this method to be pursued.

Mention is also made of an unfinished experiment with lung tissue of mice affected with these tumours.

In a final experiment it was determined that mice absolutely immune against Ehrlich carcinoma were only relatively immune against the sarcoma.

II. Sections were made through transplants of tumour tissue referred to in I and examined microscopically. Proliferation of marginal tumour cells and their penetration into the host's tissue in non-immune animals was observed, whilst in immune animals the tumour transplant was treated like a foreign body and surrounded by a dry, fibrous capsule which caused its necrosis.

These processes are illustrated in photomicrographs and the mechanism of the tissue reactions is discussed in detail.—J. E.

NUTRITION IN RELATION TO DISEASE

GODDEN, W. (1939). **" Trace " Elements in Human and Animal Nutrition.**—*J. Soc. chem. Ind., Lond.* **58.** 791–796. [Numerous refs.]

Now that modern refinements in micro-analytical technique enable μg. quantities of an element to be estimated, G. points out the difficulty of deciding when an element becomes a " trace " element. No attempt is made to answer this question but a discussion is given of elements which are undoubtedly present in foodstuffs in traces only and yet play an important role in nutrition. The function of such elements as Cu, Mn, Co, Zn, Ni, Al, Sr, Ba, Be, F, Br, I, and Se is dealt with and the toxic effects of the presence of excess of some of them is discussed. Such elements as Ca, P, Mg, Fe, Na, K, and Cl can hardly be classed as " trace elements " and are not dealt with.

—R. ALLCROFT.

HENRY, M., & BENJAMIN, M. S. (1938). **Mineral Deficiency in the Southern Coastal Belt of New South Wales. II. Nowra-Moruya.**—*Sci. Bull. Dep. Agric. N.S.W.* No. 64. pp. 24. 1 map. [For part I, see *V. B.* **4.** 440].

This work is an extension of the earlier work by the authors. It records the results of soil analyses for available CaO, P_2O_5, and nitrogen in " affected " and " unaffected " areas from a number of parishes in the Nowra-Moruya district, and the mineral and protein content of the pastures, together with general botanical and geological data for the areas concerned.

In " non-affected " areas, *i.e.* where signs of osteomalacia and osteophagia could not be found among the cattle, the average percentage amounts of citrate soluble (available) P_2O_5, CaO, and of nitrogen present in the soils were 0·0058, 0·115 and 0·32 respectively. The corresponding figures for " affected " areas were 0·0031, 0·074 and 0·21.

In the pastures from " non-affected " areas the average percentage amounts of P_2O_5, CaO, and crude protein (expressed on a moisture-free basis) were 0·53, 0·57 and 11·12. The corresponding figures for pastures from " affected " areas were 0·24, 0·38 and 7·59.

The botanical composition of pastures in " affected " areas shows a marked predominance of the poor fodder-yielding types (*e.g. Poa caespitosa, Festuca* spp., *Sporobolus indicus, Echinopogon ovatus, Aristida vagans*) with some better species such as *Eragrostis* sp. and *Danthonia* sp. Clovers, trefoils, medicks, paspalum, and rye grass are generally absent or present only in small quantities. Differences are also recorded in the tree associations of " affected " and " unaffected " areas.

A survey of the clinical incidence of the

disease is appended with geological notes on each parish. This is summarized in the map provided.—H. B. Carter.

Anon. (1940). **Iron Deficiency in Cattle in the Tropics.**—*Vet. Med.* **35.** 357–358.

The author (E. F. J.) raises a query about a peculiar condition of cattle in the West Indies. Under range conditions they thrive, but after being fed stall rations prior to being worked they lose condition and gradually are unable to rise, lying for weeks eating and ruminating until they finally die. P.M. examination shows thin and watery blood, pale lungs and heart muscle, liver and kidneys of a buff colour, and shrunken lymph nodes. Lung and intestinal parasites are sometimes found. Various tonics including Fe and Cu, and Fowler's solution were tried without success. A comment is provided by "G.A.R." who concludes that the trouble is due to Fe deficiency in the food and recommends prevention by changes of pasture and a suitable supply of red iron oxide and copper sulphate.—Alfred Eden.

Witjens, J. C., & Huber, F. L. (1938). Bestrijding van de "osteomalacie" (osteodystrophia fibrosa) bij de australische paarden van het koninklijke Nederlandsch-Indische leger. **[Osteomalacia in Australian Horses in the Dutch East Indies].**—*Acta Conv. tert. trop. malar. Morbis, 1938.* Pt. 1. pp. 174–185. 1 table. Amsterdam: Societas Neerlandica Medicinae Tropicae. [In Dutch].

The occurrence of equine osteodystrophia fibrosa is reviewed for the years 1907–1937 in relation to views on mineral imbalance. Imported Australian cavalry horses on rations with $CaO : P_2O_5$ at 1 : 2 were affected, whereas the lighter indigenous horses on a ratio of 1 : 1·5 escaped. After supplementing the military rations in 1926 with 50 g. of chalk per head per day, to raise the calcium intake and improve the Ca : P ratio, no fresh cases occurred.—H. H. Green.

Golumbic, C., & Mattill, H. A. (1940). **α-Tocopherylquinone and Dystrophy in Rabbits. [Correspondence].**—*J. biol. Chem.* **135.** 339–340. [7 refs.]

Doses of 2–10 mg. per day of α-tocopherylquinone given by mouth and parenterally to 12 young rabbits was entirely ineffective in preventing or curing muscular dystrophy. From these results it is concluded that in the young rabbit α-tocopherylquinone cannot replace α-tocopherol in preventing dystrophy.
—R. Allcroft.

Lansing, A. I., & Miller, D. (1940). **Dysfunction of the Biliary System and Hemorrhages in the Gizzard of the Chicken.**—*Poult. Sci.* **19.** 258–262. 1 table. [7 refs.]

A series of four experiments was conducted in an attempt to determine the association of the failure of bile to enter the duodenum with the occurrence of haemorrhage and erosion in the gizzard of fowls of different ages [see also *V. B.* **8.** 801].

By ligaturing the bile ducts under anaesthesia, newly developed haemorrhages in the gizzard were produced in six out of seven adult fowls from 5–21 days after the operation; these fowls had been fed a normal diet throughout life. At autopsy the livers were altered in appearance and the gall bladders were either distended or ruptured.

Observations were made on the bile system and gizzard of 85 apparently normal chicks 1–2 days old. Absence of bile in the cystic duct of 63 was very often associated with a haemorrhagic condition of the gizzard. These results were confirmed by X-ray examination of the liver and gall bladder of chicks after oral administration of "shadocol" (sodium tetracodophenolphthalein).

The effect of feeding casein, maize oil, or maize starch on the biliary system of young chicks was also studied.

Vitamin K deficiency, considered by some workers to be the cause of haemorrhage in the gizzard, was studied with negative results. Breeding hens receiving an apparently adequate level of alfalfa leaf meal produced chicks with haemorrhagic gizzards, but in many of these chicks the cystic ducts contained no bile [see *V. B.* **9.** 108].—S. G. Iyer.

Chaikoff, I. L., & Connor, C. L. (1940). **Production of Cirrhosis of the Liver of the Normal Dog by High Fat Diets.**—*Proc. Soc. exp. Biol., N.Y.* **43.** 638–641. 2 figs. [3 refs.]

Four normal dogs were fed a high fat diet adequate in respect of essential food factors. After periods of from 138–386 days the animals died, the livers of three of them showing a severe diffuse fibrosis and in all of them a fatty infiltration of the liver was found. This diffuse fibrosis distinguishes the type of cirrhosis from

that produced in dogs by alcohol, although, as with depancreatized dogs kept alive with insulin, severe fatty infiltration of the liver was evident in all cases.—ALFRED EDEN.

SUTTON, T. S., & BRIEF, B. J. (1938). **Cellular Changes in the Anterior Hypophyses of Vitamin-A Deficient Rats.**—*Endocrinology.* **23.** 211–215. 2 tables. [11 refs.]

Weanlings rats, 24 days old, were depleted of vitamin A reserves and afterwards maintained on a low vitamin A diet for about 5–6 weeks, at the end of which period the symptoms of A deficiency were apparent, *viz*, xerophthalmia, muscular inco-ordination, and respiratory disorders. The animals were killed and the pituitary glands sectioned and examined histologically; these were compared with sections obtained from normal animals. A significant increase was found in the basophilic cells in the hypophyses of the vitamin A deficient rats of both sexes. This increase approached the condition found in true castrates. The increase in basophile count was greatest in the males; this may be accounted for on the basis of a more nearly complete destruction of the germinal epithelium of the male gonad. The evidence indicates that a vitamin A deficient diet causes direct damage to the gonad and the increase of beta cells represents a compensatory change in the hypophysis.—R. ALLCROFT.

CHERNYSHEV, G. V. (1939). Opyt bov'y s avitaminoznymi zabolevaniyami u porosyat. [**Deficiency Diseases in Piglets**]. —*Sovyet. Vet.* No. 12. pp. 57–58.

A case is described of vitamin B deficiency in 52 pigs and piglets experimentally fed exclusively on mill sweepings for 50 days. The animals showed the characteristic symptoms of pellagra which soon disappeared on the addition to the diet of constituents of the vitamin B complex. —E. MARTIN.

RAO, M. V. R. (1940). **Studies on Vitamin-A Deficiency. Part IV. The Effect of Carotene on the Peripheral Nerve Lesions produced by Vitamin-A Deficiency.**—*Indian J. med. Res.* **27.** 731–734. 1 table. [6 refs.] [Author's summary copied *verbatim*].

A study has been made on rabbits of the effect of adding adequate amounts of carotene to a vitamin-A deficient diet, after the animals had developed xerophthalmia. While recovery from xerophthalmia took place, anatomic lesions in the peripheral nervous system persisted and showed no evidence of regeneration.

MOORE, L. A., & SYKES, J. F. (1940). **Cerebrospinal Fluid Pressure and Vitamin A Deficiency.**—*Amer. J. Physiol.* **130.** 684–689. 1 fig. [7 refs.]

Blood plasma carotene determinations and cerebrospinal fluid pressures were determined on a group of Holstein calves before and after receiving a low carotene ration. Data on only three of the experimental animals are given since they are representative of the group as a whole. The results show that a deficiency of vitamin A in the ration of the young bovine produces an increase in the C.S.F. This correlation is quite definite because when vitamin A was withdrawn from the ration, plasma carotene decreased and the C.S.F. pressure increased; when the deficiency was corrected the plasma carotene increased and the C.S.F. pressure slowly decreased, but in only one case did the pressure completely return to the normal level. This appears to indicate that the disturbances produced by vitamin A deficiency are slow in repair. The increase in the C.S.F. pressure was accompanied by papilloedema, night blindness, syncope, and inco-ordination. It is suggested that the papilloedema is a direct result of the elevated C.S.F. pressure and is not due to pressure on the optic nerve caused by stenosis of the optic canal [see also *V. B.* **11.** 123.] because papilloedema also occurs in mature cows on a vitamin A deficient diet without any apparent stenosis of the optic canal. Addition of vitamin A resulted in a gradual disappearance of the symptoms [see also *V. B.* **10.** 456]. —R. ALLCROFT.

PELOZAR, M. J., Jr., & PORTER, J. R. (1940). **The Utilization of Nicotinic Acid and Related Pyridine Compounds by the Proteus Group of Organisms.**—*J. Bact.* **39.** 429–435. 1 table. [18 refs.]

The growth-promoting activity of nicotinic acid and of 13 related compounds was tested by adding them to Fildes' basal medium in amounts which gave final concentrations of $2 \times 10^{-5} M$. A total of 189 strains of organisms of the *Proteus* group, some of which were able to grow on the basal medium alone, was used. The inocula were taken from 24-hour agar slant cultures, and five successive transfers, with resultant growth on each occasion, were accepted as evidence that the medium satisfied the nutritive requirements of the organism.

The majority of strains grew on media containing nicotinic acid or nicotinamide, and the

following compounds were found to be biologically active :– ethyl and diethyl nicotinamides, sodium, ammonium and ethyl nicotinates, and nicotinyl glycine. Picolinic, quinolinic, α-amino-pyridine-3-carboxylic, and pyridine betaine-3-carboxylic acids, and also trigonelline, were inactive. Except for the activity of diethyl nicotinamide, these results are in agreement with those published elsewhere for strains of *Staphylococcus aureus*.

" Morgan's bacillus " has been associated with the *Proteus* group, but of 37 strains of this organism tested as above, none grew on any of the media employed.—A. N. Worden.

Richardson, L. R., & Hogan, A. G. (1940). **Relation of Pantothenic Acid to Dermatitis of the Rat.**—*Proc. Soc. exp. Biol., N.Y.* **44.** 583–585. 1 table. [4 refs.]

When pantothenic acid and vitamin B_6 were given simultaneously to rats which had developed dermatitis, the animals recovered within a week and made considerable gains in weight. Animals which received B_6 alone improved, but most of them had a recurrence of the disorder within 15 days. Most of the rats which received pantothenic acid alone improved, but none of them made a complete recovery. The eyes of the animals which did not respond to B_6 alone were more severely affected than those of the animals which did not respond to pantothenic acid alone.—R. A.

—. (1940). **Riboflavin. Annotated Bibliography.** pp. 119. Rahway, N.J., New York, Philadelphia, St. Louis, Montreal & Toronto : Merck & Co. Inc. [4to] [Mimeographed].

A compilation of 575 abstracts and titles of papers on riboflavin and all matters directly or indirectly concerned with the vitamin. It forms a very useful reference book.—R. A.

PUBLIC HEALTH

Troisch, E. (1938). Das Vorkommen des Bact. murisepticum (R. Koch) im faulenden Pferde- und Hundefleisch und Versuche, diese Infektionsquelle für den Menschen auf veterinäranatomischen Präparierböden auszuschalten. **[Occurrence of *Pasteurella muriseptica* in Putrefying Horse and Dog Flesh and Attempts to Prevent Human Infection].**—*Inaug. Diss., Berlin.* pp. 13. 1 table. [20 refs.]

T. isolated *P. muriseptica* from decomposed carcasses of horses 15 times, from those of cattle twice and from those of dogs twice. The organism was recovered both from the surface and from the interior of such carcasses, from 5–12 days after the onset of decomposition.

In the disinfection of carcasses used for the study of anatomy, T. found that the injection into blood vessels of 5% formalin mixed with 3% carbolic acid and 25% glycerin in water, was effective.—J. E.

Codling, J. H. (1940). **Treatment of Abattoir Wastes.**—*Nature, Lond.* **146.** 9–12. 2 figs.

Abattoir wastes usually available for treatment by municipal authorities consist of condemned meat and the viscera of slaughtered beasts. To this may be added, whilst not strictly abattoir waste, such materials as fish and fish offal waste. From such crude raw materials, after suitable processing, there are produced feeding meals for pigs and poultry and organic fertilisers, whilst incidental to the process is the reclamation of the valuable fat content of the tissues.

Referring to his own experience in the city of Birmingham, C. states that about 5,000 tons of abattoir waste are treated annually, from which are produced about 1,000 tons of fertilisers or feeding stuffs and about 200 tons of fat. The recovery from the bones in household refuse is carried out by a special process by firms specializing in this work.

Condemned meat is a valuable raw material, yielding after treatment a feeding meal with an analysis of 10% water, 55% protein, 10% oil, and 9% phosphoric acid. Abattoir offals together with ingesta are treated together for the production of fertiliser and recovery of their valuable gut tallow. Fish wastes are treated separately either for fertiliser, or in the case of white fish for feeding meal.

C. gives a short description of the dry-rendering process and plant in operation in Birmingham. He states that as low a quantity as 3 tons of raw material per week can be processed to yield a satisfactory return. Household wastes can be converted into feeding meals with the same plant, except that fat extraction is unnecessary in this case.—N. J. S.

BAHR, L. (1939). Erwiderung an Oberveterinärrat Direktor Dr G. Baars, Stettin. **[Reply to a Note by Baars on Experiments on Wild Rats with Ratin and Ratinin.**—*Z. InfektKr. Haustiere.* **54.** 255–256].—*Z. InfektKr. Haustiere.* **55.** 302–305.

In a previous publication [*V. B.* **10.** 54.], Bahr recorded the virulence of certain strains of salmonella for rats. These cultures have been maintained over a period of years and he considered them of value for rodent extermination. Baars was unable to confirm the high virulence of some strains and doubted the value of this method of rodent extermination. This present article criticises the last article of Baars and in it Bahr points out that of the nine so-called Gärtner strains used, two were the Dublin type and although there was a low mortality the rats and mice would have attained some immunity after two months—the time they were kept. It is also pointed out that the strains are passaged from animal to animal and that the standard ratinin preparation of squills should be given 3–4 weeks after the organism; this breaks down the resistance of rodents which are still alive, so that they die from the salmonella infection.—R. LOVELL.

THERAPEUTICS

—. (1940). **New Names for Drugs.**—*Brit. med. J.* May 18th. 824.

These are pharmacopoeial names, free from trade mark rights, which have been chosen by the British Pharmacopoeia Commission for certain proprietary drugs, *e.g.* soluble hexobarbitone for evipan sodium.—J. M. ROBSON.

—. (1939). **Therapeutic Requirements in War.**—*Brit. med. J.* Oct. 21st. 813.

The Medical Research Council has formed a Therapeutic Requirements Subcommittee to advise on matters relating to economy in the use of drugs. The subcommittee will endeavour to ensure the most effective and most economical use of drugs and therapeutic substances.—J. M. ROBSON.

I. ANON. (1939). **Progress in Chemotherapy.**—*Brit. med. J.* Feb. 18th. 340–341. [1 ref.]

II. MARSHALL, E. K., Jr. (1940). **The Present Status and Problems of Bacterial Chemotherapy.** — *Science.* **91.** 345–350.

III. CROSSLEY, M. L. (1940). **Recent Advances in Chemotherapy.**—*Ibid.* 369–373.

I. Of the many compounds which have been synthesized since the discovery of prontosil and sulphanilamide, uleron and sulphapyridine are worthy of individual mention (sulphathiazole is probably also important). It is important to think of the activity of these substances in terms of the bacteria which they affect, rather than of diseases. Thus sulphonamides may be of value in the treatment of otitis media and mastoiditis, since pneumococci are sometimes concerned. There has been much work on the mode of action of these substances, and it is now believed that they interfere with the metabolism of the bacteria.

II. The conditions in which sulphonamides produce favourable effects are described; it is pointed out that favourable effects may also be due to the cure of some secondary infection. The therapeutic efficiency varies greatly not only between different types of bacteria (*e.g.* of pneumococci), but even between different strains of the same type. There is an absence of accurate quantitative data on the activity of the sulphonamides in different infections. A standard method is described by which such comparisons can be made. In bacterial chemotherapy the maintenance of a more or less constant concentration of drug in the blood and tissues during night and day is necessary for the most effective therapy, and a constant blood concentration of drug during the period of therapy may be maintained by using food in which the drug has been incorporated.

The need for experimental work on species other than the mouse is emphasized. Further work is also necessary on the toxic action of these drugs, especially in relation to the concentration of drug in the blood and to the duration of its presence there. There is a brief discussion of the relation of chemotherapeutic activity to chemical structure and to toxic action.

III. The progress made in the treatment of animal parasites is first reviewed, particularly in amoebiasis, leishmaniasis, malaria, and trypanosomiasis. The use of quinoline and

acridine compounds, of pentavalent antimony compounds, and of organic arsenicals is discussed. Germanin has been found effective in the treatment of sleeping sickness. It is emphasized that the greatest obstacle to progress is the lack of knowledge of the mechanism of drug action and what properties a compound should have to be effective. In spite of all the work done, nothing definite can be said about the relation of chemical structure and parasiticidal action. The number of compounds of the sulphonamide series that have been made exceed 2,000, but few of these are valuable drugs; the useful ones include sulphanilamide, sulphapyridine and sulphathiazole.—J. M. R.

DOMAGK, G. (1939). Der derzeitige Stand der Chemotherapie der bakteriellen Infektionen. **[The Present Position in the Chemotherapy of Bacterial Infections].** —*Z. klin. Med.* **136.** 167–199. 18 figs., 2 tables. [Numerous refs.]

A general review of the question, dealing with the chemotherapy of human infections. An extensive reference list is divided into fifteen main headings—most of them concerning a type of infection.

I. ROSENTHAL, S. M., BAUER, H., & ELVOVE, E. (1939). **Studies in Chemotherapy. IX. Antibacterial Action of some Aromatic Arsenic, Sulfur, and Nitro Compounds.**—*Publ. Hlth Rep., Wash.* **54.** 1317–1336. 7 tables. [Numerous refs.] [For part VIII, see *V. B.* **10.** 553].

II. ROSENTHAL, S. M., & BAUER, H. (1939). **Studies in Chemotherapy. X. Colorimetric Tests for Aromatic Hydroxylamines and for Further Oxidation Products of Aromatic Amines. Their Demonstration in the Urine Following Sulfanilamide Administration.**—*Ibid.* 1880–1890. 5 tables. [15 refs.]

III. BAUER, H., & ROSENTHAL, S. M. (1939). **Studies in Chemotherapy. XI. Antibacterial Action of Phosphorus Compounds. Preliminary Report.** — *Ibid.* 2093–2095. 2 tables. [3 refs.]

I. Two types of compounds have been found to possess antibacterial properties, *viz*, (1) the asymmetric 4-nitro-4′-aminodiphenylarsinic acid and corresponding arsyloxide and arsine, active against streptococcal infections in mice, and (2) simple aromatic nitro compounds, *e.g.* 4-nitrobenzoic acid, active especially against pneumococcal infections in mice.

II. Colorimetric methods have been developed for the detection of aromatic hydroxylamines and for further oxidation products of the amino group of aminobenzene derivatives. Following the oral administration of sulphanilamide to various species, the hydroxylamine derivative has been demonstrated in the urine. Smaller percentages occurred in the rat and the dog than in other species; in the rat and the dog qualitative tests for further oxidation products of the amino group of sulphanilamide were obtained in the urine.

III. The secondary compound, *bis* (4-dimethylaminophenyl) phosphinous acid, administered by mouth or subcutaneously, was as active as sulphanilamide against streptococcal infections in mice; the effect against pneumococcus was much less pronounced. The compound has a low toxicity and is worthy of further study.—J. M. ROBSON.

DESCAZEAUX, J., COURTADE, R., & ROCQ. (1939). Le para-aminophénylsulfamide (1162F) dans la chimiothérapie des infections par le streptocoque gourmeux. **[Para-Aminophenylsulfamide (1162F) in the Chemotherapy of Strangles Streptococci].**—*Bull. Acad. vét. Fr.* **12.** 307–318. 6 figs. [7 refs.]

The authors made a preliminary trial of this drug in mice infected with strains of strangles streptococci. It was found that some strains obtained from advanced cases of the disease in horses were very virulent for mice. These strains were employed, as it has been shown that the best results in experimental chemotherapy are not obtained with strains which need to be inoculated in large numbers.

A dosage of 0·01 g. per mouse once a day for four days in one experiment, and twice a day for two days in another experiment, was tried. In each case the first dose preceded the inoculation of organisms by half an hour. The results were most favourable in the latter experiment, where the concentration in the body was greater owing to the two doses a day. It follows that dosage must be such as to obtain a high concentration of the drug for a length of time sufficient to inhibit the organisms until the defence mechanism of the body can deal with them.

A healthy horse weighing 500 kg. was dosed with 50 g. of 1162 F, that is 0·1 g. per kg., and the concentration in the blood at various stages was determined. In the first hour after

administration the concentration was 8·5 mg. per 100 c.c. of blood, and remained so for three hours. It fell rather rapidly in the next six hours and in 24 hours it had reached practically zero.

Based on these results, eight horses with a natural infection were treated with this drug, the above dosage being given daily for at least six days. It was found that a rapid cure was effected in horses with the septicaemic form of infection (four cases), but in animals with more chronic lesions, such as pulmonary abscesses, the results were not as good.

Case notes and temperature charts are given quite fully.—D. L. HUGHES.

CARNES, W. H., & BISKIND, G. R. (1940). **The Effect of Testosterone Propionate on the Development of Tuberculosis in the Immature Male Guinea Pig.**—*Johns Hopk. Hosp. Bull.* **66.** 297–312. 3 figs. on 1 plate, 3 tables, 2 graphs. [Numerous refs.] [Authors' summary copied *verbatim*].

Testosterone propionate has been administered to immature male guinea pigs, by subcutaneous implantation of pellets of the drug, during the course of their infection with tuberculosis. The animals were all sacrificed after the same period of infection together with the controls. No effect of the treatment was observed on the extent of distribution or character of the lesions nor on the degree of skin sensitivity to tuberculin.

I. HAMANN, E. E., & HUDDLESON, I. F. (1939). **Effect of Sulfapyridine (Dagenan) on *Brucella abortus in vitro* and *in vivo*.**—*Proc. Soc. exp. Biol., N.Y.* **42.** 555–556. 1 table.

II. WILSON, G. S., & MAIER, Irene. (1940). **Treatment with Sulphapyridine (M & B 693) of Guinea-Pigs Infected with Brucella abortus.**—*Brit. med. J.* Jan. 13th. 47–50. 2 tables. [8 refs.]

I. The authors find that sulphapyridine has a definite bacteriostatic effect on *Br. abortus in vitro*. Flasks of tryptose broth, containing sulphapyridine 1 : 1,000, 1 : 10,000, and 1 : 100,000 respectively, and blank controls were seeded with 5,000–6,000 virulant *Br. abortus* and 1 c.c. explants made into tryptose agar at 10 minutes—7 days. Small increases occurred at first in all, but marked decrease occurred after five days at 1 : 1,000 and 1 : 10,000, the final counts being 230 and 250 respectively. Slight increase occurred throughout at 1 : 100,000.

Eleven g. pigs were given subcutaneously 0·5 c.c. of a thin suspension of *Br. abortus* (McFarland 1), six were treated from the 11th day onwards with sulphapyridine *per os* in doses varying from 16·4–250 mg. per day (in three doses) for 10 days. All were killed at 29 days and all gave positive agglutination reactions and cultures.

II. The authors record two experiments in which g. pigs infected with *Br. abortus* were treated with sulphapyridine *per os* or with soluble sulphapyridine subcutaneously and were compared with untreated controls. In the first experiment treatment was begun six weeks after injection with 1,000,000 organisms, and in the second experiment three days after injection with 1,400,000 organisms. The results were similar. The extent of the lesions, number of colonies which could be grown from spleen and lumbar lymph nodes, and agglutinin titres were favourably affected by treatment with 0·6–0·8 mg. per g. body weight given in two portions daily for a fortnight, but complete sterilization was only achieved after 4–6 weeks treatment. Larger doses of 1–15 mg. per g. were found to be too toxic, whilst subcutaneous use of the soluble product had to be abandoned on account of its local effects. Attention is drawn to the similarity of the results of treatment with sulphanilamide [see *V. B.* **9.** 652.] and sulphapyridine in g. pigs infected seven weeks and six weeks previously respectively. Sulphanilamide is preferred on account of its lower toxicity. Use of sulphanilamide is, however, favoured only in brucella infections in man which have proved resistant to other treatment, as continued use of the drug is attended by considerable danger.—A. W. S.

STEPHENSON, Dora, & ROSS, Helen E. (1940). **The Chemotherapy of Cl. welchii Type A and Cl. septique Infections in Mice.**—*Brit. med. J.* March 23rd. 471–475. 9 tables. [5 refs.]

Experiments carried out with two strains of *Clostridium welchii* Type A, one highly toxigenic and the other much less so, showed that both sulphanilamide and sulphapyridine are of therapeutic value for infection of mice with this organism. Either drug administered within an hour after intraperitoneal infection with five lethal doses usually prevented death. Intramuscular infection was, however, only checked when the infecting dose was sublethal. Infec-

tion with *Cl. septique* was distinctly less amenable to either drug, but sulphapyridine had more effect than sulphanilamide. Comparative tests were carried out with the drugs and antitoxins and with combinations of the two.

—J. R. Lawson.

Chain, E., Florey, H. W., Hardner, A. D., Heatley, N. G., Jennings, M. A., Orr-Ewing, J., & Sanders, A. G. (1940). **Penicillin as a Chemotherapeutic Agent.**—*Lancet.* **239.** 226–228. 1 table. [7 refs.]

A method has been devised for obtaining a considerable yield of penicillin as a stable powder soluble in water. The preparation has a very low toxicity. It inhibits the growth of many types of bacteria *in vitro*. *In vivo* penicillin was found to protect mice against infections with *Streptococcus pyogenes*, *Staphylococcus aureus* and *Clostridium septique*. Penicillin does not appear to be related to any chemotherapeutic substance at present in use and is particularly remarkable for its activity against the anaerobic organisms associated with gas gangrene.—J. M. Robson.

Launoy, L. (1937). Sur l'action des traitements répétés, par le 205 Bayer-309 Fourneau (Germanine-Moranyl), d'une infection expérimentale a Trypanosoma annamense, du chat. [**Action of Repeated Doses of Germanin-Moranyl on *T. annamense* Infection in Cats**].—*Festschrift Bernhard Nocht, 1937.* pp. 262–266. [3 refs.] Hamburg: Friederichsen de Gruyter & Co. [In French]. [Abst. from author's summary].

Repeated treatment of a cat, infected with *T. annamense*, with germanin given in subtherapeutic doses at every relapse after the initial infection, produced a condition of paraimmunity, so that a massive inoculation of the infective organism was relatively ineffective.

Boyd, G. H., & Dunn, M. (1939). **Effects of Quinine and Plasmochin Administration upon Parasite Reproduction and Destruction in Avian Malaria.**—*Amer. J. Hyg.* Sect. C. **30.** 1–17. 1 fig., 6 tables. [11 refs.] [Authors' summary copied *verbatim*].

1. When quinine hydrochloride is given in doses of 0·5 milligram or more around 7 : 45 A.M. each day the reproduction of the parasites is retarded and, in many cases, apparently prohibited. Those organisms that do undergo schizogony produce a much reduced number of merozoites.

2. When given in doses of 0·25 to 0·5 milligram at 7 : 45 A.M. daily the occurrence of reproduction is not markedly inhibited but the number of merozoites formed by each schizont is reduced.

3. Our observations indicate that quinine in these smaller doses does not increase the daily destruction rate of these parasites either directly or indirectly.

4. Plasmochin in daily doses of 0·02 milligram reduces the characteristic number of merozoites produced by a single schizont of *Plasmodium cathemerium*. This average, as determined from 31 infections, did not fall below 8·07.

5. Under plasmochin administration the periodicity of reproduction which usually characterizes *Plasmodium cathemerium* is disrupted. The period of reproduction is delayed and prolonged and a normal amount of reproduction does not seem to occur.

6. Plasmochin administration in daily doses of 0·02 milligram does not appear to result in any greater destruction of parasites than would occur without treatment.

Gorshkov, I. P. (1938). Opyty gazoterapii diktiokauleza ovets i metastrongilezov svinei. [**Gas Treatment of *Dictyocaulus* Infestation in Sheep and *Metastrongylus* Infestation in Swine**].—*Trud. vsesoyuz. Inst. Helmintol.* **3.** 152–202. 33 tables. [Numerous refs.] Moscow: Selkhozgiz.

The therapeutic possibilities of chlorine inhalation were investigated in *Dictyocaulus* and *Metastrongylus* infestation in sheep and swine respectively. Concentrations of 1 : 30,000 and 1 : 20,000 were allowed to act for 30–60 minutes, according to the degree of infestation. Autopsy of the treated animals showed that, on an average, 44·4% of the sheep and 50% of the swine were free from these helminths. In the remainder of the treated animals the degree of infestation was found to be greatly reduced when compared with that of the controls, the average reduction in the numbers of helminths being 90·3% in *Dictyocaulus* infestation of sheep and 78·3% in *Metastrongylus* infestation of swine. Chloropicrin gave similar results.—E. Martin.

Adamy, O. (1938). Untersuchungen über die Wirksamkeit von Calcimagon, Glukalz-

amid, Malzcalzamid und Calciumglukonat bei der Myoglobinurie der Pferde. **[Efficacy of "Calcimagon", "Glukalzamid", "Malzcalzamid" and Calcium Gluconate in Equine Myoglobinuria].**—*Inaug. Diss., Berlin.* pp. 26. 9 tables. [Numerous refs.]

Trials on 28 horses with slight or severe myoglobinuria showed that none of the named preparations had any curative effect. Their active principles were calcium in combination with magnesium, glucose, maltose, and glucose respectively for the remedies in order of mention.—J. E.

I. Hodge, H. C., & Finn, S. B. (1939). **Reduction in Experimental Rat Caries by Fluorine.**—*Proc. Soc. exp. Biol., N.Y.* **42.** 318–320. 1 table. [6 refs.]

II. Volker, J. F. (1939). **Effect of Fluorine on Solubility of Enamel and Dentin.**—*Ibid.* 725–727. 1 fig. [9 refs.]

III. Cheyne, V. D. (1940). **Inhibition of Experimental Dental Caries by Fluorine in the Absence of Saliva.**—*Ibid.* **43.** 58–61. 1 table. [8 refs.]

I. A number of rats were divided into three groups; one group was fed an adequate diet plus powdered milk, one with added casein, and the third with added casein plus daily additions of 3 mg. KF. After 200 days the animals were killed and the teeth examined for signs of caries. It was found that the group receiving the F had a very much lower incidence of caries, 13 out of 42 animals being entirely caries-free.

II. Samples of human teeth enamel and dentine were shaken with various concentrations of NaF, and after thorough washing in distilled water the solubility of portions of these samples in acetic acid-sodium acetate buffer of pH 4·0 was determined. The action of the NaF considerably diminished the solubility compared with untreated control samples, and this seems to indicate that F combines with tooth substance to produce a less soluble product. The possible application of these findings to the prevention of dental caries is discussed.

III. It has been noticed that in fluorine areas the incidence of caries is lower than normal. The author set out to demonstrate the cause of this, using weaned rats deprived of their salivary glands in order to exclude the possibility that saliva may act on the tooth surfaces directly and so influence the result. The salivary glands were removed from 32 newly weaned rats leaving 44 as controls. All were placed on a caries-producing diet, but 12 of the operated animals received in addition 3 mg. F daily. After 200 days all the rats were killed and the teeth examined for carious cavities. The reduction of saliva greatly increased the incidence of caries as compared with controls. F exerted a protective action and retarded the progress of decay.—Alfred Eden.

Andreoni, R. (1938). Esperimenti di autoemoterapia e di eteroproteinoterapia nella intossicazione da iprite nel cane. **[Treatment of Mustard Gas Poisoning in Dogs by Autohaemotherapy and Heterohaemotherapy].**—*Profilassi.* **11.** 1–3. 6 figs. [English and French summaries].

A. found that the subcutaneous injection of the animal's own blood, of milk, or of normal horse serum had no beneficial effect on the healing of mustard gas skin wounds in dogs.—J. E.

—. (1939). **Surgical Smells.**—*Lancet.* **237.** 1177–1178. [3 refs.]

A brief note concerning the disadvantage of using cod liver oil for dressing septic wounds [see also *V. B.* **10.** 796.] *viz*, the extremely offensive smell. As a means of mitigation it is suggested that sterilization of the air by aerosols [*V. B.* **10.** 620.] may be of use. The value of nascent oxygen has already been demonstrated in removing the smell of offensive cancers and colostomies, and in the P.M. room.—R. A.

I. Avery, T. B., Scott, H. M., & Conrad, R. M. (1940). **Effect of Parathyroid Preparation on the Blood Calcium of the Fowl.**—*Poult. Sci.* **19.** 321–323. 3 tables. [6 refs.]

II. Avery, T. B., Scott, H. M., & Conrad, R. M. (1940). **Effect of Parathyroid Preparation on the Calcium Metabolism of the Fowl.**—*Ibid.* 324–325. 1 table. [7 refs.]

I. Intramuscular injection of 0·5 c.c. of parathyroid extract per kg. body weight caused no significant increase in the blood Ca of moulting hens, laying hens, immature pullets or cockerels. Larger doses of extract (1·5 c.c. per kg.) had no effect on moulting hens, nor did any increase in blood Ca occur after subcutaneous injections of 1·5 c.c. per kg. on the first day followed by 0·5 c.c. per kg. for six days.

II. Ca balance experiments on eight moult-

ing hens showed that subcutaneous injection of 4·5 c.c. of parathyroid extract over a period of seven days produced no effect on the body Ca reserves.—R. Allcroft.

Macpherson, A. I. S., & Robertson, E. M. (1939). **Clinical Use of Triphenylchlorethylene.** — *Lancet.* **237.** 1862–1866. 4 tables. [14 refs.]

Triphenyl chlorethylene is a new synthetic oestrogen which produces the same effects as the naturally occurring oestrogens. It can be safely administered by mouth, by injection, or as a local application. It has no definite toxic effects and can be given in large doses or over a long period of time. The duration of action by mouth is similar to that of stilboestrol. By injection, the action is very prolonged and 500 mg. so given produces an effect which lasts for 8 to 9 weeks.—J. M. Robson.

—. (1939). **Chemotherapy in Gynaecology.**—*Lancet.* **336.** 97–98. [13 refs.]

An annotation on the production and application of "stilboestrol" (4 : 4′-dihydroxy-$\alpha\beta$-diethylstilbene), a synthetic chemical compound which can replace a natural sex hormone. In the treatment of certain conditions related to the genital system it was found that the responses were similar to those obtained with natural hormones or their derivatives (oestrone, oestradiol, or oestradiol monobenzoate). Oral administration was as effective as intramuscular injection.—R. Allcroft.

POISONS AND POISONING

Barrett, H. M., Best, C. H., MacLean, D. L., & Ridout, J. H. (1939). **The Effect of Choline on the Fatty Liver of Carbon Tetrachloride Poisoning.**—*J. Physiol.* **97.** 103–106. 1 fig. [2 refs.]

Rats fed a diet low in lipotropic factors, but with small quantities of added choline, developed very fatty livers within 20–28 days following poisoning by injection of CCl_4. In other rats on a similar diet but with addition of excess choline, livers were of practically normal fat content in a similar period under similar conditions of poisoning. These results suggest that choline or some other lipotropic factors are essential for removal of the excess fat which accumulates in the livers of rats following CCl_4 poisoning.—Alfred Eden.

Spörri, H. (1940). Vergiftungserscheinungen bei Militärpferden durch Robina pseudo-acacia (falsche Akazie). [**Poisoning of Army Horses by False Acacia** (*Robinia pseud-acacia*)].—*Schweiz. Arch. Tierheilk.* **82.** 112–116. [14 refs.]

An outbreak of poisoning in military horses was traced to the gnawing of freshly cut branches of *Robinia pseud-acacia*. Detailed clinical symptoms, commencing within 24 hours, are given. As many as 50 horses were affected, one so severely that it was destroyed. P.M. findings included stomatitis, haemorrhagic gastro-enteritis and parenchymatous degeneration of the liver. The non-fatal cases varied from inappetence and apathy, with increased cardiac frequency, reddening of the mucous membranes of mouth and tongue and sometimes of the conjunctiva, to sweating, cramps, and bloody diarrhoea. The symptoms corresponded to those expected from the toxalbumen "robin" isolated from the plant by Power and Cambier in 1890 and further investigated by Power in 1912, rather than to the alkaloid and glucoside also described as present.—H. H. Green.

Legg, J., & Francis, W. D. (1939). *Threlkeldia proceriflora*: **A Plant Poisonous to Stock.**—*Aust. vet. J.* **15.** 168–171. 2 figs.

T. proceriflora, commonly known as "soda bush" is widely distributed throughout western Queensland, western New South Wales and northern South Australia, and is poisonous to sheep. Force-feeding of 1 lb. of the minced plant killed one sheep and four others died after consuming 2–5 lb. Watery extract from 2 lb. of the plant killed another sheep.

Symptoms observed in the field include trembling, frothing at the mouth, twitching of the facial muscles, regurgitation, and rapid death in sternal decubitus in acute cases. In subacute cases diarrhoea may be present which is accentuated on driving and death may be delayed for two or three days.

The outstanding lesions are congestion of the abomasum and first few feet of the duodenum, some congestion of liver, kidneys, and spleen, and haemorrhages in the myocardium.

—H. B. Carter.

PHYSIOLOGY

WINCHESTER, C. F. (1940). **Growth and Development. With Special Reference to Domestic Animals. LI. Seasonal Metabolic and Endocrine Rhythms in the Domestic Fowl.**—*Res. Bull. Mo. agric. Exp. Sta.* No. 315. pp. 52. 8 figs., 9 tables. [Numerous refs.]

As a result of the experiments described in this bulletin, W. concludes that there is a rough parallelism between egg production, heart rate, and fasting heat-production in pullets. (Fasting heat-production was determined between the 25th and 30th hours of fasting). When heat production is expressed in relation to body weight, the fasting metabolism in good layers is consistently greater than in poor layers, but the difference is not significant.

It was found that thyroidectomy resulted in a profound depression of egg production; administration of suitable doses of thyroxin to the thyroidectomized hens restored egg production to 60% that of normal birds. The egg production declined in normal fowls when excess thyroxin was administered.

This bulletin also describes a modified Regnault-Reiset metabolism apparatus employed for measuring the metabolism of fowls, an adaptation of an electric stethoscope to the measurement of heart rates in resting fowls in closed chambers, and includes a critical review of the literature on the influence of light and heat on sex activity.—N. J. SCORGIE.

RIDDLE, O., BATES, R. W., SCHOOLEY, J. P., LAHR, E. L., SMITH, G. C., MILLER, R. A., & ELWELL, L. H. (1938). **Endocrine Studies.**—*Yearb. Carneg. Instn.* No. 37. pp. 52–60. Washington, D.C.: Carnegie Institution of Washington.

Studies are briefly reviewed on the preparation and assay of anterior pituitary hormones (adrenotrophic, gonadotrophic, prolactin), on the various factors which determine the responses to prolactin, on the effect of prolactin and other hormones on maternal behaviour and broodiness, on the cytology of the pituitary and adrenals, and on the relation of pituitary factors to metabolism.—J. M. ROBSON.

MIRSKY, I. A. (1939). **Some Aspects of the Biology of the Pancreatic Hormones.**—*Endocrinology.* **25.** 449–456. [Numerous refs.]

Some of the more recent experimental work is reviewed on depancreatized and hypophysectomized-depancreatized animals, and on dogs rendered permanently diabetic by injections of massive doses of saline extracts of anterior pituitary, and an attempt is made to build up a hypothesis of the general role of insulin in the body.

"This may be summarized by the generalization that the pancreas tends to preserve the depots of foodstuffs in various parts of the body, as compared with the anterior pituitary gland which tends to accomplish the reverse. So long as the pancreas is functionally intact, it is improbable that the syndrome of diabetes mellitus can be produced by any agent other than one which directly involves the function of the liver and its ability to retain glycogen."

Of veterinary interest are the notes on the different degrees of disturbance which follow removal of the pancreas in various species. The cat develops a very marked ketosis and glycosuria, but the syndrome is of decreasing severity in the dog, pig, monkey, goat, and fowl. The relative mildness of the diabetes in the pig and goat has been ascribed to a low degree of hypophyseal activity in these species.

The possible existence of pancreatic hormones other than insulin is discussed, in particular the "fat metabolizing hormone" (lipocaic) postulated by DRAGSTEDT and his co-workers. Choline and other substances, however, appear to be capable of exerting the action claimed for lipocaic, and it is considered by some that it is the presence of these substances in Dragsted's extracts which is responsible for the hormone-like action.—A. N. W.

I. CARTER, H. B. (1939). **Fleece Density and the Histology of the Merino Skin.**—*Aust. vet. J.* **15.** 210–213. [2 refs.]

II. BELSCHNER, H. G. (1939). **Fleece Density.**—*Ibid.* 214–215.

I. C. studied the histology of the sheep's skin as a new method of approach to research in wool production of merino sheep. One of the first observations made was that there are two different types of follicles: (1) a primary follicle which is distinguished by its association with a sudoriferous gland, a well developed sebaceous gland, and an arrector pili muscle, and (2) a secondary follicle usually associated with a small sebaceous gland. Primary follicles are the first to appear in the foetus and they give rise to the birth coat medullated fibres. These fibres mostly drop out later and

are replaced by true wool fibres (non-medullated) but these tend to comprise the largest fibres in the fleece. On the other hand, secondary fibres appear at a later stage of foetal development and appear never to produce anything but true wool. It is thought that the ratio of primary and secondary follicles may be of considerable significance. By means of histological methods it is thus possible to determine not only the absolute density of total population of follicles, but also the ratio of primary to secondary follicles, while information may also be obtained as to the grouping of the follicles. The significance and relation of these determinations to the other characteristics of the fleece are being investigated.

II. A general discussion on I pointing out the potential importance of this work in relation to practical sheep breeding.—W. I. B. B.

I. Blake, T. A. (1940). **Fertility Counts. Service Inaugurated for Testing Fertility of Bulls.**—*N. Z. J. Agric.* **61.** 175–179.

II. Ward, A. H. (1940). **What was Revealed from the Figures.**—*Ibid.* 179–182. 2 tables.

I. An article in popular language discussing the importance of the bull in dairy cattle breeding. A service has been inaugurated by the Department of Agriculture whereby any farmer may have the bull's semen examined and receive a report indicating whether the bull should prove fertile or unsatisfactory, etc. It has been shown that the fertility of the bull may be judged with some certainty by such examination.

II. W. compares the classification of sires on a basis of actual performance with Blake's classification [see I] on a basis of semen examination.

He found that of 66 classifications only five could be regarded as errors of such a nature as to mislead the owner. He considers that such an error (8%) should be considered as highly satisfactory when considering the practical application of semen examination work.

A table is given which shows the degree of correlation between the results of the two methods of examination.—Lewis Fitch.

Dempsey, E. W. (1939). **The Relationship between the Central Nervous System and the Reproductive Cycle in the Female Guinea Pig.**—*Amer. J. Physiol.* **126.** 758–765. 10 figs. [15 refs.]

Various types of brain lesions were produced by surgical interference in adult female g. pigs, and subsequent ovulation and sexual behaviour, including activity of the vaginal membrane, were studied in surviving animals. In addition, ten previously ovariectomized animals were hypophysectomized, and their response to injections of oestrin and progesterone noted. The extent of the brain damage was confirmed by autopsy and by histological sections.

Mating behaviour, but not ovulation, was abolished by lesions which destroyed the inferior colliculi [corpora quadrigemina]. Section of the pituitary stalk, and lesions involving the septal and preoptic regions or the pretectal area, did not appear to influence sexual behaviour.—Alastair N. Worden.

Dobriner, K., & Rhoads, C. P. (1940). **The Porphyrins in Health and Disease.**—*Physiol. Rev.* **20.** 416–468. 5 figs., 7 tables. [Numerous refs.]

Despite the importance to medicine of the metabolism of the pyrrol compounds in relation to the physiology of the respiratory pigments, few subjects have been the source of so much confusion as the porphyrins. This review should serve to clear the way for a better understanding of the present status of the subject. Although it is impossible to abstract an article already so condensed, the scope may be briefly indicated.

The first eight papers are devoted to the somewhat complicated chemistry of the porphyrins as a class, especially the naturally occurring, but not interconvertible, types I and III. Under normal conditions *in vivo* synthesis is directed to the formation of relatively large amounts of type III porphyrins, which later combine with iron and specific proteins to form haemoglobin and other respiratory pigments, and small amounts of type I which form the corresponding types of excreted uroporphyrin and coproporphyrin [see also *V. B.* **10.** 966]. Under certain conditions the normal ratio of types may be disturbed with a resultant disorderly increased formation of type I compounds, and often with the production of abnormal derivatives as in the case of congenital porphyria.

This section is followed by one on the isolation of porphyrins, their chemical and physical properties, and their occurrence in nature. The physiology of the porphyrins is then discussed, one of the most interesting points being their photosensitizing action and the severe oedema of the skin of regions exposed to light after injection of haematoporphyrin. The different

types of porphyrins vary considerably in photosensitizing action, and evidence of deposition in the skin has been obtained. In this connexion veterinarians will recall the work of RIMINGTON, FOURIE, ROETS and QUIN at Onderstepoort, in connexion with "geeldikkop" of sheep and congenital porphyria or "ochronosis" of cattle. In one of the cows studied by RIMINGTON, 168 mg. of urophorphyrin and 90 mg. of coproporphyrin were excreted daily in the urine, as well as 1,000 mg. of coproporphyrin in the faeces, the ratio of type I to type III compounds in the urine being 28 : 1.

Other disease conditions discussed in relation to clinical and chemical findings include acute porphyria, chronic porphyria, porphyrins in liver disease, in pernicious anaemia, in haemolytic jaundice and other blood diseases, in deficiency diseases of the pellagra type, and in toxic states such as lead poisoning, sulphonal poisoning, salvarsan dermatitis, alcoholism, selenium poisoning, and photosensitization resulting from treatment with sulphanilamide. Recently RIMINGTON and HEMMINGS, and independently BROWNLEE, have advanced the view that coporporphyrin type III may be produced after the formation of methaemoglobin, which, when once formed, is degraded by a mechanism which leads to porphyrins instead of bile pigments.—H. H. G.

FAIRLEY, N. H. (1940). **The Spontaneous Disintegration of Certain Blood Pigments, with Special Reference to Methaemalbumin Formation.**—*Brit. J. exp. Path.* **21.** 231–242. 5 tables. [11 refs.]

Incubation of human plasma with haemoglobin at 37°C. results first in the formation of methaemoglobin, due to the shift of pH to 8·0 or more, and then within 48 hours a new pigment, methaemalbumin, is formed. No such pigment or alkaline shift is obtained when an aqueous solution of Hb is incubated alone, but when whole blood is incubated alkaline methaemoglobin is formed in the plasma but not in the sedimented corpuscles.

Methaemalbumin, characterized by an α band at 623–624 $\mu\mu$, is present after ten days when human or simian plasma is incubated with Hb in considerable concentration, and can be salted out by $(NH_4)_2SO_4$ in the albumin fraction entirely free from Hb or methaemoglobin; it can be prepared in a pure state as a water-soluble pigment on drying *in vacuo* over H_2SO_4.

There appear to be three stages demonstrable in the catabolism of Hb incubated with human or simian plasma:—(1) the production of neutral or alkaline methaemoglobin, (2) the splitting up of the latter into globin and haematin (ferric), and (3) the coupling of haematin with serum albumin to give methaemalbumin. With the plasma of rabbits and many other mammals there seems to be some evidence of slight haemalbumin formation under the conditions described above, although the main bulk of the pigment produced spectroscopically resembles haematin.—ALFRED EDEN.

APINIS, P. (1938). Untersuchungen über Blutfäden. [**Blood Filaments in Domestic Animals**].—*Acta. Univ. latv., Vet. Med. Fak.* Ser. I. **5.** 443–467. 1 fig. [18 refs.] [In German].

Blood filaments were observed in horse, sheep, cat and fowl blood. They arise from the stroma of the red blood corpuscles and at first adhere to the cell, later detaching themselves. They form most quickly in blood diluted with normal saline and may be seen in 20–30 min.; they reach their full length in 24–48 hours and then break up fairly rapidly.

The filaments show more or less vigorous, irregular Brownian movements, but are non-motile. Morphologically, they are similar in all animals, but slight differences in shape were observed, and they were not seen in every case when the blood was taken after death. No differences were noted in the filaments in blood from healthy or diseased animals.—J. A. N.

BOMFORD, R. R. (1940). **Effect of Repeated Intravenous Injections of Bilirubin on Erythropoiesis in Anaemic Dogs.**—*Brit. med. J.* Oct. 26th. 549–551. 1 table, 1 chart. [9 refs.]

Two dogs were rendered anaemic by bleeding and kept so by periodic removal of known amounts of Hb. Various Fe compounds were fed or injected and finally the effects were studied of repeated injections of pure bilirubin upon the rate of production of Hb, reticulocyte response, and mean cell volume. Bilirubin caused an increase in the rate of production of Hb and a prolonged reticulocyte response. A suggestion is made that bilirubin acts as a kind of erythropoietic hormone, but at the moment there is no direct evidence for this supposition.—ALFRED EDEN.

FOSTER, R. H. K. (1940). **On the Rôle of Oxalic Acid in Blood Clotting.**—*Proc. Soc. exp. Biol., N.Y.* **44.** 136–139. 2 tables. [13 refs.]

Quantities of oxalic acid injected into normal rabbits had no effect upon the coagulation time of the blood until a sufficiently high level was reached, at which point clotting was delayed. Similar results were obtained with heparinized rabbits, and normal and vitamin K deficient chicks.—ALFRED EDEN.

MULLIN, F. J., DENNIS, J., & CALVIN, D. B. (1938). **Blood Potassium in Tetany and Asphyxia of Dogs.**—*Amer. J. Physiol.* **124.** 192–201. 1 fig., 2 tables. [Numerous refs.]

Neuromuscular tetany was induced in dogs by decreasing the Ca : K ratio of the cerebrospinal fluid at the cisterna magna, either by lowering the Ca ions by injection of 0·5 c.c. 27% sodium citrate, or by washing out the cerebrospinal fluid with a Ca-free solution or with one containing four times the normal K concentration. In some experiments the linguo-maxillary reflex was used as a test of the effect of raising the K level in the blood, this being produced by the injection of KCl into the carotid artery. Asphyxia was produced by clamping the trachea or making the dogs re-breathe through a long tube. In every case in which anoxaemia or tetany was produced there was a definite increase in the K content of the whole blood and of the separated plasma. The increase could not be accounted for on the basis of a loss of blood fluid, or a shift of K from erythrocytes to plasma. It is suggested that the extra K entering the blood may come from muscles as a result of activity or from the liver, due to adrenalin stimulation. This increase in the plasma K may serve to increase central nervous system irritability and synaptic conduction during asphyxia, and may reflect even greater localized K changes in the C.N.S.
—R. ALLCROFT.

TECHNIQUE AND APPARATUS

OAG, R. K. (1940). **The Resistance of Bacterial Spores to Dry Heat.**—*J. Path. Bact.* **51.** 137–141. 2 tables, 1 graph. [3 refs.] [Author's summary copied *verbatim*].

1. The effect of dry heat upon the spores of virulent strains of *B. anthracis*, *B. welchii*, Vibrion septique and *B. anthracoides* is recorded.

2. At 400°C. these are killed in 20–30 seconds, whereas at 120°C. an hour's exposure is necessary.

3. There is apparently an abrupt change in resistance at 160°C., for spores are much more rapidly killed above than below this temperature.

4. From extrapolation of the graph of these results it would appear that spores may survive for a very few seconds at temperatures above 400°C.

5. The time necessary to fix a film of spores is very much less at any given temperature than that required to kill the organisms.

WOOLSEY, C. A. (1939). **A More Rapid Method of Guinea Pig Inoculation for the Diagnosis of Tuberculosis.**—*J. Lab. clin. Med.* **24.** 855–857. [3 refs.]

The average time for diagnosis of tuberculous exudates by means of intracutaneous injection of g. pigs is three weeks as compared with 6–8 weeks by the older subcutaneous procedure. After shaving a small area on the side of the abdomen 0·4 c.c. of the infective material is injected intracutaneously. A nodule averaging 2 mm. in diameter appears in 7–21 days, from which smears are examined for acid-fast bacilli. One g. pig may receive more than one injection of suspected fluid collected at various times, or two exudates from different sources of the same patient, on opposite sides of the abdomen.

Since the rapid diagnosis made from the initial lesion can be substantiated by subsequent regional adenopathy and autopsy there is little chance of a spontaneously infected g. pig not being recognized as such. Of 173 g. pigs injected in the recorded series only five died before the presence or absence of tubercle bacilli could be established.—H. H. GREEN.

RYU, E. (1940). **A Simple Method of Differentiation Between Gram-positive and Gram-negative Organisms Without Staining.**—*Kitasato Arch. exp. Med.* **17.** 58–63. 1 table. [4 refs.] [In English].

Three methods are described. In the first several drops of 5% aqueous solution of phenol are placed on the smear to be examined and gentle heat applied. The majority of the Gram-negative organisms are detached and produce turbidity; the Gram-positive organ-

isms remain fixed to the slide. In the second method several drops of 5% aqueous caustic potash solution are placed on a slide, and in the third, half a drop of concentrated sulphuric acid is used and young culture added and mixed. The Gram-negative organisms in the second method become markedly viscous and, in the third, clear and transparent, while in neither case do the Gram-positive organisms show any change [see also *V. B.* **10.** 562].—J. R. L.

OFFICIAL AND OTHER REPORTS

GREAT BRITAIN. (1938). **Colonial Development Advisory Committee. Ninth Annual Report covering the Period 1st April, 1937—31st March, 1938.** pp. 35. Numerous tables. London: H.M. Stat. Off. [8vo] [9d.]

Of veterinary interest are the following:– the committee recommended a grant of £207,974 spread over seven years for tsetse research in Tanganyika, a grant of £1,900 for three years for tsetse control in Kenya, a grant of £5,000 to meet expenses of a vaccination campaign against bovine contagious pleuropneumonia in Northern Rhodesia, a grant of £2,491 for additional assistance in the campaign against undulant fever in Malta, and a grant of £11,400 for the provision of a water supply and of cattle dips on routes from grazing areas to a meat factory in Kenya.

The committee also made suggestions for the provision of funds for financing colonial veterinary scholarships beyond the experimental period of five years which terminated in 1938.—J. E.

GREAT BRITAIN. (1940). **Thirty-Seventh Annual Report of the Imperial Cancer Research Fund, 1938-1940.** pp. 43. London: Royal College of Surgeons. [4to].

PULLINGER has studied the earliest reaction of tissues to the action of polycyclic hydrocarbons known to be carcinogenic. She has recorded a type of reaction occurring 2–4 days after application of the carcinogenic agent which is probably specific and consists of swelling of the cells and nuclei, vacuolation of the cytoplasm, and subsequent cell multiplication. Closely related hydrocarbons which are not carcinogenic do not provoke this reaction. CRABTREE has investigated the effect on tumours induced by carcinogenic hydrocarbons of substances known to affect tissue metabolism. Substances which inhibit glycolysis were found, under varying experimental conditions, to cause either retardation or acceleration of tumour formation. LUDFORD has published work suggesting that leucocytes and macrophages stimulate the proteolytic activity of malignant cells and thus facilitate invasion of normal tissues.

Other work described includes studies of the antigenic properties of filtrable tumours by FOULDS and DMOCHOWSKI. The latter worker and KNOX have recorded the presence of two antigens in fowl tumour filtrates, one being species specific and the other not normally found in fowl tissues. The two antigens can be distinguished by complement fixation.

—E. G. WHITE.

GREAT BRITAIN. (1939). **Report of the Work of the London School of Hygiene and Tropical Medicine (University of London) Incorporating the Ross Institute, for the Year 1938-39.** pp. xiii+94. 4 photographs, 3 appendixes. London: London School of Hygiene and Tropical Medicine. [8vo].

The following sections of the report are of interest:–

DEPARTMENT OF CLINICAL TROPICAL MEDICINE.—HAMILTON FAIRLEY reported the synthesis from alkaline haematin and crystalbumin of the blood pigment, pseudomethaemoglobin, which he has renamed methaemalbumin; he concluded that it is formed from extra corpuscular haemoglobin when blood is destroyed in large quantities and remains in the circulation for a sufficient period of time; it is subsequently disposed of by the liver.

DEPARTMENT OF PARASITOLOGY. — YOUNG continued the investigation of helminths of subclinical importance in Great Britain, and prepared a bibliography of Australian helminthology [see *V. B.* **10.** 680]. VAN SOMEREN published three papers on trichinosis, and natural infections with trichinosis were discovered in 3 out of 12 rats caught in south London. As in former years the helminths found in animals dying in the Zoological Gardens were examined and reported upon to the Zoological Society.

DEPARTMENT OF ENTOMOLOGY.—WIGGLESWORTH produced a text-book on "The Principles of Insect Physiology" [reviewed in *V. B.*

10. 403]; NASH completed investigations, commenced in West Africa, upon the effect of climatic factors on the pupae of *Glossina morsitans* and *G. tachinoides*.

DEPARTMENT OF BACTERIOLOGY AND IMMUNOLOGY.—The work on the isolation of immunologically active substances from various bacteria, carried out in collaboration with the Department of Biochemistry, made steady progress; the main advance was in the use of bacterial cells grown on synthetic media, so avoiding the contamination of the antigenic fractions with agar, or with constituents of the ordinary laboratory media.

GREENWOOD, BRADFORD HILL and JOYCE WILSON continued the study of experimental epidemics in mice, an attempt being made to assess the effect of closeness and continuity of contact on the spread of mouse typhoid.

WATSON made progress in studies on the effect of diet on the fertility, survival, and resistance of mice; 24 different diets were investigated, and it was found that the fertility of mice on a diet containing oatmeal and 70–80% of dried separated milk fell almost to zero, control experiments showing that this fall in fertility was not due to lack of vitamin E or solely to the high protein content of the diet.

G. S. WILSON and MAIER tested sulphanilamide on g. pigs infected with *Brucella abortus*, and found that doses bordering on the toxic limit given over a period of six weeks led to the elimination of the organisms from the tissues. The effect of M & B 693 is now under investigation. These workers, with the co-operation of SCHWABACHER, also continued their studies on the effect of desensitization on the development of infection in tuberculous g. pigs, and found that desensitization with tuberculin can probably never be completely effected in well-nourished animals, but that the lowering of sensitiveness which is effected by large daily doses of tuberculin leads to a longer average survival time and to a diminution in the extent of the lesions found at necropsy. The effect appeared to be partly non-specific.

DUNCAN confirmed earlier experiments indicating that the aggregation of bacteria sensitized by a specific antiserum is largely homogenous, not mixed, but that in precipitation tests with soluble antigens the primary antigen-antibody particles aggregated non-specifically to form mixed particles.

CRUICKSHANK investigated the curative action of sulphanilamide compounds and other drugs in experimental anthrax in mice, and showed that only M & B 693 had a significant curative effect.

MCFARLAN investigated the possible effect of hormones on resistance to bacterial infection.

DEPARTMENT OF BIOCHEMISTRY AND CHEMISTRY AS APPLIED TO HYGIENE.—FREEMAN and ANDERSON prepared antigenic fractions from *Salmonella typhi-murium* and from *S. typhi* by three widely different methods and compared the products by chemical methods and by the determination of their toxicity for mice; the similarity of the properties of these fractions led to the conclusion that they represent the essential antigenic complex of the bacteria in question in a state approaching chemical homogeneity. A method for the determination of the galactose content of bacterial cells and antigenic fractions was elaborated and applied to the problem of the determination of the extent of agar contamination of bacterial fractions obtained from organisms grown on agar media.

HENDRY attained some success in the preparation of active fractions from *Erysipelothrix rhusiopathiae* by extraction of the cells with ammonia and with urea; a fair amount of the alkali-soluble, active material has been accumulated, but preliminary experiments indicate that it is not homogenous.

DELAFIELD and CAMERON studied the glycogen and sugar distribution in animals poisoned by the bacterial fractions from *S. typhi-murium* prepared by TOPLEY and RAISTRICK.

HIGGINBOTTOM and WOOLDRIDGE completed their work on the effects of toxins of the *Clostridium* group upon the succinic oxidase of mammalian tissues, and showed in the course of their work that the toxin of *Cl. welchii* inhibits the succinic respiratory mechanism, possibly by some action on a "carrier catalyst".

An investigation was started by WOOLDRIDGE and DELAFIELD upon the activities of various tissue enzymes in animals treated with toxic preparations from *S. typhi-murium*.

TWIGG concluded his studies on the natural oxidation-reduction system of cow's milk which causes the reduction of methylene blue; the system appeared to be composed of four essential factors which can be isolated from the milk, and it was shown definitely that ascorbic acid plays no significant part in the system.

INSTITUTE OF AGRICULTURAL PARASITOLOGY.—Biochemical experiments were carried out to

observe the effect of individual helminth infections on the metabolism of the host.

J. W. G. LEIPER continued his studies on the nematodes of horses and sheep. A new laboratory method for the concentration of suspensions of nematode infective larvae was worked out; the experiment to determine the seasonal incidence of sheep nematodes at pasture is being continued; a longevity experiment on *Fasciola hepatica* is still in progress.

PETERS published a descriptive analysis of some 22 typical habitats of *Limnaea truncatula* in Wales and southern England; the distribution of fascioliasis in England and Wales is now being mapped in some detail; progress was made on a critical review of the published literature on the sub-family Fasciolinae.

SANDERSON continued tests of the anthelmintic value of a series of chemicals against intestinal nematodes of sheep; parasympathetic stimulants were used either alone or in conjunction with known anthelmintics with the object of bringing about removal of the parasites through increased glandular secretions and stimulation of intestinal peristalsis, but the method showed no marked efficiency; intra-abomasal administration of the drugs was found to be unsatisfactory.

The stomach contents of rabbits were examined to ascertain the effect of stomach acidity on the development of nematode eggs.

CLAPHAM investigated serological reactions to tapeworm infestations; no positive blood reactions were obtained in dogs harbouring *Taenia*. Further observations were made on the life history and pathogenicity of *Syngamus trachea*, and the importance of wild birds in the transmission of the disease is being investigated.

NORTHERN IRELAND. (1938). **Report for the year 1937 of the City Veterinarian, County Borough of Belfast.** [MCLEAN, A.] pp. 10. 8 tables. Belfast: S. C. Allan & Co. Ltd. [fcp].

The work at the Belfast Municipal Abattoir in connexion with the *ante-mortem* and *post-mortem* examination of animals slaughtered for human food is dealt with. The total numbers of animals slaughtered were:–43,423 cattle; 101,840 sheep and lambs; 1,110 goats, and 10,026 pigs. The numbers condemned from all causes were:– 502 cattle; 229 sheep and lambs; 13 goats, and 219 pigs. In cattle TUBERCULOSIS accounted for 67% of the seizures; it is estimated that this loss amounts to £50 per week. Tables are included which show (1) the different diseased conditions causing total destruction of carcasses of various animals; (2) a comparison between TB. and other diseases as a cause of condemnation of carcasses, and (3) the number of diseased organs seized.

Other activities included the inspection of butchers' shops, pork stores, cold stores, and cowsheds and dairy cows within the city boundary.—J. C. WALLACE.

AUSTRALIA. (1937). **First Annual Report of the Australian Wool Board, dated 31st July, 1937.** pp. 16. 4 appendixes. Canberra: L. F. Johnston. [fcp] [9d.]

At a conference held in January, 1937, the Board declared its intention to allocate funds to various research institutes for the investigation of nutritional and genetic problems and of sheep conditions such as foot rot, enterotoxaemia, myiasis, and parasitic infestations. The relationship of faulty nutrition and disease to the quality and quantity of the wool was stressed. The establishment of the National Research Station (Gilruth Plains) in Queensland was decided upon.

NEW ZEALAND. (1939). **Report of the Live-Stock Division, Department of Agriculture 1938-39.** [BARRY, W. C.]—*Rep. Dep. Agric., N.Z., 1938–39.* pp. 9–22. 5 tables.

The normal work of the division was greatly hindered by an outbreak of FACIAL ECZEMA which necessitated the utilization of an advisory service in the affected districts.

During the year five additions to the veterinary staff were made possible through the return of graduates who had been studying abroad under the system of veterinary bursaries now in operation. Although this addition of staff has improved the position, there is still a need for further veterinary assistance to deal with the routine of field work and meat inspection, as well as to meet the needs of veterinary research into animal health problems in the Dominion.

During the year 32 approved stallions were registered under the Remounts Encouragement Act of 1914 which has just been made operative. As a result of this scheme owners of approved mares are enabled to use subsidized stallions at reduced fees. During the year the Stallions Act was passed with a view to ensuring the soundness of draught stallions for breeding.

Numbers and results are given of tuberculin tests on cattle and of condemnations under the

Stock Act for scheduled diseases. New farms have been found to be infected with JOHNE'S DISEASE in Taranaki and Waikato. The position appears to be improving in Taranaki, many affected farms not having had a reactor for periods up to five years. The position is less favourable in the Waikato, where the number of reactions from non-clinical cases tends to remain high on some farms, even after repeated testing. The incidence of MASTITIS, CONTAGIOUS ABORTION, TEMPORARY STERILITY, GRASS STAGGERS, etc. is discussed. The outbreak of FACIAL ECZEMA referred to above resulted in serious losses to the dairy farmers.

PHOTOSENSITIVITY was the most serious disease of sheep. Many animals died or were destroyed and many which survived the initial outbreak succumbed later on. The lambing percentage was adversely affected. The results of a survey of causes of sheep mortality in the Canterbury Province suggest the primary importance of nematode parasitism. Other diseases discussed include PULPY KIDNEY, BLACK DISEASE, CASEOUS LYMPHADENITIS, PREGNANCY TOXAEMIA, HYDATIDS, etc.

The total slaughterings of pigs at registered premises for the year 1938–39 are given, as well as the incidence of TUBERCULOSIS, rejections for export, etc.

Livestock statistics are given which include the numbers of cattle, sheep, and pigs in the Dominion, and slaughterings and importations.

—LEWIS FITCH.

NEW ZEALAND. (1939). **Report of the Veterinary Laboratory, Wallaceville, 1938-39.** [HOPKIRK, C. S. M.]—*Rep. Dep. Agric., N. Z., 1938–39.* pp. 23–33.

GENERAL.—The activities of the laboratory have been divided into three sections, Nutrition under CUNNINGHAM, Diagnosis under FITCH, and a section combining pathology, specific disease, parasitology etc. under the personal supervision of the Officer-in-Charge. The staff was augmented by the addition of three veterinarians and two chemists.

BLACKLEG vaccine to the extent of 48,300 doses was made at the laboratory and distributed free to farmers. The usual supplies of various vaccines and sera were imported and distributed on behalf of the Commonwealth Serum Laboratories of Australia. 422 doses of DISTEMPER virus-serum were imported on behalf of dog owners.

CATTLE DISEASES.—A summary of the results of the MASTITIS control scheme in operation at Hamilton from 1931–1939 is given. These show no lasting benefit and the possible explanations are discussed. JAMES and PALMER-JONES investigated the anomalous results obtained by the use of the bromthymol blue test when checked by the leucocyte assessment method of diagnosing mastitis. The factors which make any form of colour indicator testing inaccurate were considered to be :– (a) many cases of mastitis do not give an alkaline reaction ; (b) the reading is upset by the quantity of cream, by the interval of time elapsing between taking samples and reading, by the quantity of milk used in the tubes when taken by the farmer, and by the quantity of bromthymol blue used in the test ; (c) by the personal factor, many workers being unable to distinguish colours or shades of one colour. A table is appended giving a comparison between leucocyte counts and bromthymol blue tests carried out weekly in three herds. The results of microscopic and cultural examination of milk samples from the Wallaceville dairy herd was followed into a second season.

BLAKE continued his observations on male FERTILITY. During the year 103 samples of semen were collected and reported on, 95 being from bulls and the remainder from horses and rams. Of the bulls 27 were classed as good, 27 fair, 26 poor, 8 bad, and 7 sterile. The percentage of successful first services of 50 bulls is given. The analysis shows a fair agreement between the result of sperm examination and performance.

637 cows were used in an artificial insemination trial by THOMPSON. The percentage conception was 31·6. Difficulty was encountered in using untrained bulls and even more in obtaining daily, over 3–4 weeks, the required amount of semen for a round of herds.

The position with regard to TRICHOMONIASIS is not serious. Over a three-year observation period in the Waikato only four herds showed infection.

Experimental work on GRASS STAGGERS and ragwort-feeding of sheep and cattle is discussed.

SHEEP DISEASES.—Of 586 specimens received, FACIAL ECZEMA accounted for over 200. ENTEROTOXAEMIA specimens numbered 87 and CONTAGIOUS ECTHYMA 16.

Plans for the investigation of FACIAL ECZEMA are outlined at length. They include an intensive study of the disease, and of the conditions under which it occurs. Attempts are to be made to reproduce it experimentally.

An experiment was in progress at Mamaku to determine the minimum quantity of cobalt top-dressing and the intervals at which this should be applied to protect sheep against BUSHSICKNESS.

Routine work was carried out on suspected cases of ENTEROTOXAEMIA from the field, and in many cases toxins were typed by neutralization tests. Experimentally the disease was produced by drenching lambs with ewe's milk containing a 24-hour culture of *Clostridium welchii* Type D.

No toxin could be demonstrated in the bowel of naturally occurring cases of ENZOOTIC ICTERUS. Experimental chronic copper poisoning was induced and the susceptibility of affected sheep to oral administration of *Cl. welchii* Type A was tested. The animals resisted this attempt to set up infection and succumbed later to the effects of copper poisoning.

SWINE DISEASES.—The usual run of specimens was received. Fewer specimens from SARCOPTIC MANGE cases were received; SALMONELLA INFECTIONS were responsible for the largest number of deaths. Three cases of ERYSIPELAS were recorded, which was exceptional as this condition is very rarely seen in New Zealand. Male pigs fed a ration high in maize showed testicular degeneration similar to that observed in rats under similar feeding conditions.

POULTRY DISEASES.—282 birds were received for examination, the main diseases being COCCIDIOSIS, PERITONITIS, LEUCAEMIA and PULLORUM DISEASE. Whole-blood agglutination tests were carried out on a number of properties and revealed an incidence of from 10–15%. The incidence appeared to be correlated with adverse conditions, usually due to bad management.—LEWIS FITCH.

BURMA. (1938). **Report on the Civil Veterinary Department, for the Year Ending the 31st March 1938.** [MITCHELL, D. T.] pp. 36. 7 tables, 2 graphs, 3 maps. Rangoon: Supt. Govt. Printing & Stat. [8vo] [Rs. 2=3s.]

The organization of the department remained unchanged throughout the year. The staff consisted of the director, with two deputy directors, seven veterinary superintendents, 31 veterinary inspectors, and 158 veterinary assistants. New appointments included nine graduates of Indian colleges posted to districts after completing a post-graduate course at Insein Veterinary College, and also 13 students from this college. Six students were selected in 1937 for training at the Madras Veterinary College and three were granted scholarships for three years. Two Burma science graduates of Rangoon University were granted State scholarships to take the course for the M.R.C.V.S. diploma in the United Kingdom.

The field staff treated 27,836 animals during the year while on tour. This service is primarily of educational value as the cases are seldom seen a second time. Over 1,600 animals were treated at Insein veterinary hospital and cases were dealt with at the veterinary dispensary at Tatkon.

Infectious disease outbreaks included 1,364 of RINDERPEST in which there were 11,161 deaths, a reduction of 64% on the figures for the previous year; this is attributed to the numbers of animals immunized with goat-spleen vaccine (549,564). FOOT AND MOUTH DISEASE occurred in 15 districts and 328 animals died. ANTHRAX has been controlled by the use of spore vaccine; the numbers immunized were 7,922 cattle, 486 horses, and 653 elephants; there were 825 deaths in 30 districts. HAEMORRHAGIC SEPTICAEMIA caused 3,987 deaths; vaccination gave good results in the enzootic areas, 28,390 cattle being vaccinated. BLACKLEG caused 336 deaths; no vaccine is used. There were no cases of EPIZOOTIC LYMPHANGITIS, and only one outbreak of STRANGLES; 212 animals were given prophylactic vaccine at the Pyawbwe stud farm with satisfactory results. Cases of GLANDERS were dealt with at Insein (4), Myitkyina (3), and Maymyo (3); the disease is still present also among gharry ponies at Rangoon.

In tests on cattle carried out at the laboratory, the immunity conferred by RINDERPEST desiccated goat spleen vaccine was found to last at least 25 months. The onset of immunity had been shown to be solid within 72 hours of administering 0·0025 g. dried goat-spleen vaccine; further experiments have shown that this dose of the vaccine gives a serviceable immunity in 24 hours and a solid one in 36 hours. A test was made of the value of the vaccine when used on the semi-tame gaur or mythun (*Bos gaurus*), which is used in the Chin Hills. The 12 animals tested all reacted to rinderpest on the third or fourth day after vaccination, all had acute rinderpest and four died. ANTHRAX spore vaccine was successful in protecting over 3,000 elephants; the only

deaths of elephants from anthrax were of two that were not vaccinated. No notable results were obtained in the investigations it was possible to carry out on KUMRI and DRY COAT in horses. Recommendations for the control of the existing contagious diseases are included, with a summary of the existing position. The animal husbandry position is also dealt with.
—J. A. GRIFFITHS.

NIGERIA. (1940). **Annual Report on the Veterinary Department for the Year 1938.** [HENDERSON, W. W.] pp. 81. 2 tables, 1 appendix. Lagos: Govt. Printer. [8vo] [1s. 6d.]

The number of the staff remained the same as in the previous year, one vacancy for a veterinary research officer was not filled at the end of the year on grounds of economy. RINDERPEST control was still the main occupation of the department, together with that of the other cattle diseases which are dealt with by mass immunization. The numbers treated were :– BLACKLEG 561,717; ANTHRAX 51,385; HAEMORRHAGIC SEPTICAEMIA 29,567; TRYPANOSOMIASIS 11,088, RINDERPEST, serum-virus inoculation 407,270, rinderpest vaccine only 223,643, and BOVINE CONTAGIOUS PLEURO-PNEUMONIA 200,000. There were 46 immunization camps in operation during the year at different seasons to suit the local conditions of pastures and water supply.

Few cases of TUBERCULOSIS occurred except among cattle from the Cameroons; among 694 cattle from the latter area 20·5% were infected. ANTHRAX remained confined to the valleys of the Sokoto and Benue rivers; the vaccinations were all done in these areas. The position with regard to BLACKLEG remained satisfactory in all provinces. TETANUS has been reported in horses. HAEMORRHAGIC SEPTICAEMIA is stated to have caused 63 deaths among 856 cattle in one camp, which was then closed for two months and, on the resumption of operations, no further losses were experienced. In the Adamawa and Plateau Provinces there were outbreaks during the heavy rains. The use of vaccine is thought to have an immediate and effective result in suppressing the outbreaks, even though the effect of its use only lasts two months; the seasonal incidence of the disease makes the further use of vaccine unnecessary until the following year. *Trypanosomiasis* is combated by treatment of infected cattle or horses and by propaganda to inform owners of cattle of the known tsetse areas in order that they may take steps to avoid infection.

FOOT AND MOUTH disease appeared in its usual mild form and was widespread in Kano Province, but was not of importance elsewhere. Field laboratories at Kano, Maidugari and Yola produced over 67,500 doses of anti-RINDERPEST serum and 94,500 doses of A-R vaccine to supplement supplies from the headquarters laboratories at Vom. The disease is now well under control in all the large provinces of Northern Nigeria, where the majority of the cattle are kept, but the annual immunizations of young cattle must be continued to maintain this position. BOVINE CONTAGIOUS PLEURO-PNEUMONIA is still a major problem in Bornu Province, but a policy of applying active measures of control, through itinerant teams of vaccinators, touring the infected districts, is having a good effect in encouraging early reporting of outbreaks, and, in consequence, these can be suppressed before they have caused serious losses. In other parts of the country the disease occurs sporadically. Altogether 200,000 head were vaccinated, 23,000 of these by the itinerant vaccinators.

The diseases of goats and sheep have exceptional importance in Nigeria on account of the value of the export trade in their skins as well as the place the flesh takes in the dietary of the natives of Northern Nigeria. CAPRINE CONTAGIOUS PLEURO-PNEUMONIA has been the most serious of the diseases causing losses as so far no means of prophylactic treatment has been discovered. It is hoped to obtain funds to carry out further research on this subject. The difficulty with this disease and also with GOAT POX has been to establish these diseases at a laboratory where a study could be carried out.

HELMINTHS are known to be a cause of losses among young animals and in one province over 26,000 calves, sheep and goats received the copper sulphate/arsenic treatment. Skin diseases, mainly demodectic MANGE and STREPTOTHRICOSIS, are also of importance and research is needed to find a remedy to prevent economic losses on the skins. Cases of EPIZOOTIC LYMPHANGITIS have been recorded in horses.

RABIES has been widespread and 24 cases have been confirmed. The enormous numbers of native-owned dogs makes control very difficult, except in townships where dogs can be more effectively controlled and stray animals destroyed.

The work of the native administrations' animal clinics has been carried on throughout the year. Over 17,000 new cases were treated in the 20 clinics. Closely associated with this work is the propaganda work to prevent cruelty to animals, by the use of the Hausa patterns of horse-bits, or by working animals affected with sore backs or other injuries, etc. The traffic in horses and dogs from the northern to the southern provinces for slaughter is also being closely watched to prevent movement of animals unfit to travel.

The Kano school for the training of African staff to carry out the duties of assistants to veterinary officers in the field has been carried on in two sessions of six months each. Thirty-eight out of 42 students passed the six-months course. About 290 of these African assistants are employed by native administrations and the veterinary department.

The livestock census which is based on tax figures shows a reduction of 116,000 cattle, but an increase of 268,000 sheep and of 10,000 goats. The totals are in round figures :– horses 173,000, asses 475,000, cattle 3,000,000, sheep 2,200,000, goats 5,600,000, camels 2,000, swine 168,000, and mules 18. The only stock improvement work done for cattle is castration of scrub bulls and surplus calves. The scheme to increase the proportion of the Red Sokoto goat by the castration of all non-red male goats, has been in operation in Sokoto Province and also in parts of Kano Province ; over 85,000 of these goats were castrated in 1938. Trials carried out by the department in co-operation with the Imperial Institute and British tanners, has demonstrated the commercial superiority of the skins of the pure red and brown goats over the cross-breds. A large part of the report is devoted to the trade in livestock and livestock products (hides and skins, and clarified butter) and the stock farm.—J. A. GRIFFITHS.

NIGERIA. (1940). **Annual Report of the Veterinary Pathologist.** [METTAM, R. W. M.]—*Rep. vet. Dep. Nigeria, 1938*. pp. 20–31.

The European staff consists of the Pathologist, the Assistant Pathologist, and three laboratory assistants with four African laboratory attendants. The main function of the laboratory is the production of anti-RINDERPEST (A-R) serum and of various vaccines for use in the control of cattle diseases. In 1938 the products were 27,845 litres of A-R serum, 99,712 doses of A-R formalinized spleen vaccine, 170 litres of BOVINE CONTAGIOUS PLEURO-PNEUMONIA culture vaccine, and 3,142 litres of BLACKLEG formalinized culture vaccine, as well as HAEMORRHAGIC SEPTICAEMIA culture vaccine, ANTHRAX spore vaccine, and a small quantity of FOWL TYPHOID and FOWL POX vaccines.

In intradermal tuberculin tests of 504 Zebu cattle on the laboratory stock farm, seven reactors were found (1·38%). A fatal PYO-PERITONITIS associated with OESOPHAGOSTOMIASIS was prevalent among sheep kept for experimental purposes ; further research on this condition is proposed.

A small experiment was carried out to test the immunizing value of A-R serum given at the same time as A-R vaccine. In eight animals so treated and injected with virus 21 days later, all became infected and four died. Of controls given virus only, 80 died. When 11 other animals similarly immunized were exposed to contact infection 21 days later, three resisted while eight became infected and three died.

Although *Theileria mutans* is often seen in blood smears, particularly in calves reacting to rinderpest, no " Koch's bodies " were seen in the tissues of over 1,000 cattle of all ages examined at the laboratory in 1938. *Anaplasma marginale* is found sometimes in calves affected with rinderpest, heavy helminth infestation, etc. M. claims that mercurochrome given intravenously is effective in the advanced anaemia of such cases.

TRYPANOSOMIASIS among cattle used for serum production is most frequently due to *T. vivax*, for which treatment with tartar emetic is usually effective, but *T. congolense* is more troublesome and animals so infected are weeded out of the herd.

Attempts were made to premunize a few calves by the method of VAN SACEGHEM, by an artificially induced chronic infection. They were inoculated with strains of *T. vivax* and *T. congolense* obtained from Ilorin. Of eight calves inoculated with the *T. vivax* strain, two died of chronic trypanosomiasis. In another group of 24 calves infected with both trypanosomes there were nine deaths. Intercurrent diseases played an important part in the reaction to the trypanosomes, the most serious being *Actinomyces necrophorus* infection, lesions of which were found in the mouth, rumen, reticulum, large intestine, and liver. The resistance of the calves to all the common

illnesses seemed to break down. Ascariasis, particularly, was difficult to control, oil of turpentine either in milk or in a mixture of linseed oil and cod liver oil proving useless in preventing fatalities from this cause. The surviving calves were to be exposed naturally to infected *Glossina* as soon as pasture conditions were suitable.

An outbreak was investigated of an acute disease of pigs in southern Nigeria in which 19 of 43 pigs had died. In a few cases *Stephanurus dentatus* and *Metastrongylus apri* were recovered from the kidneys and the lungs, while in blood smears there were large numbers of *Trypanosoma simiae*. A subacute or chronic infection of pigs on the same farm, characterized by progressive anaemia, loss of condition, muscular weakness and loss of co-ordination culminating in death, was due to a combination of infection by *T. brucei* and *T. congolense* superimposed on a massive helminth infestation; this chronic condition was reproduced in healthy pigs born at the laboratory's farm, by inoculation of strains of *T. brucei* and *T. congolense* isolated from sick pigs sent to the laboratory. Pigs proved very resistant to these strains of trypanosomes, harbouring them for 200 days and even more.

The following plants have been tested and found poisonous for cattle, in the amounts shown in brackets:—*Lasiosiphon kraussianus* (3 lb.), *Morea zambesica* (½ lb.), *Urginea nigritiana* (14 lb. fed over 14 days), *Gladiolus spicatus* (9 lb.), and *Kalanchoe lanceolata* (4–6 lb.). In each case the main lesion produced was some degree of gastro-enteritis.

A systematic collection of ticks is being made to show their distribution in Nigeria. So far *Rhipicephalus appendiculatus*, the common vector of *Theileria parva* in East, Central and South Africa, has been collected once only in Nigeria; except for *R. evertsi* and *R. sanguineus*, ticks of this genus are rare in Nigeria.—J. A. Griffiths.

BOOK REVIEWS

Hammond, J. [M.A., D.Sc. (Iowa), F.R.S., School of Agriculture, University of Cambridge]. (1940). **Farm Animals. Their Breeding, Growth, and Inheritance.** pp. 199. 114 figs., 11 tables. [Numerous refs.] London: Edward Arnold & Co. [8vo] [14s.]

Until about 20 years ago animal breeding was more of an art than a science, but since that time scientists in various branches have laid the foundation for a more rational approach to animal production and improvement. In this small book the author outlines the general scientific principles which underlie animal reproduction, growth, development and genetics, and seeks to show how the results of recent scientific research can be applied to the practical problems of livestock improvement.

The book is based on two series of lectures given at the Universities of Leeds and London, the first of these dealing with the physiology of reproduction, growth, and development of each of the farm animals, the second with the application of genetics to the practical problems of animal improvement. In each section recent scientific advances are presented only in brief outline, as a result of which the reader may get the erroneous impression that most of the difficulties encountered in animal breeding are capable of easy solution. The statement on p. 89 that "Temporary sterility is very frequent in dairy cows and a large wastage occurs from it every year—about 24% of the total wastage" may be misleading. In the original from which this figure is quoted it is not implied that temporary sterility alone reaches this amount. Again, the statement on p. 137 that "mutations can be produced at will by treatment of the germ cells by radium or X-rays" is not intended to be applied to the higher animals as its context might suggest. The author cites only two mutations, Ancon sheep and Dopplebender calves which have any semblance of real economic value; the appearance in the U.S.A. of polled Shorthorns and Herefords as mutants at a comparatively recent date may also be mentioned in this connexion.

The numerous diagrams and figures throughout the book are excellent. The very extensive list of references at the end of each chapter is of great assistance to the reader and is particularly useful in a book in which the text has been so much condensed.

The compression of such a wealth of information on animal production into the comparatively short space of 200 pages could only have resulted from a complete and comprehensive knowledge of the subject. This book may be recommended to all veterinarians, and in particular to those in the countries of the British Empire and elsewhere where the veterinary service is concerned with livestock improvement.—N. J. Scorgie.

ECKLES, C. H. [B.S.A., D.Sc., Late Chief Division of Dairy Husbandry, University of Minnesota, Formerly Professor of Dairy Husbandry, University of Missouri]. Revised by ANTHONY, E. L. [B.S., M.S., Dean of Agriculture, Michigan State College], & PALMER, L. S. [A.M., Ph.D., Professor of Agricultural Biochemistry, University of Minnesota]. (1939). **Dairy Cattle and Milk Production.** pp. xv+520. Numerous figs., 74 tables, 2 appendixes. New York: Macmillan & Co. [3rd Edit.] [8vo] [15s.]

The successful treatment and control of disease in animals presuppose an intimate knowledge of their habits and functions, of their normal growth and reproduction, and of the systems under which they are maintained and fed. This book covers these points, and brings together a wealth of essential and up-to-date information regarding dairy cattle which should prove useful to veterinarians.

Whilst the book is primarily written for the American agriculturist and dairyman, much of the subject matter is of general application, including breeds of dairy cattle, selection and breeding, management and feeding for milk production, and factors influencing the quality and quantity of milk. One of the best chapters in the book is that dealing with the growth and development of dairy heifers, which contains new and original data.

Numerous excellent photographs and diagrams are included, together with much useful tabulated data.—N. J. SCORGIE.

ALLEN, J. A. [V.S., B.V.Sc., Pathologist and Superintendent, Experimental Fur Farm, University of Manitoba], & KIRK, R. J. [B.S.A., Experimental Fur Farm Assistant]. (1940). **The Principles of Mink Ranching. Mink Ranching in Manitoba.** pp. 148. Numerous figs. [Numerous refs.] Winnipeg, Manitoba: Provincial Government, Game & Fisheries Branch. [8vo].

An historical survey of the industry is given and the more scientific aspects are dealt with under convenient headings which aid reference to this useful guide. Mink housing and equipment are very clearly illustrated and detailed specifications of all materials used in their construction are given. Breeding problems are well discussed.

A study of representative diet charts of successful ranchers reveals the importance of feeding suitable foods to quality animals, and that such food is not cheap. The ration being fed to mink on the experimental fur farm was tested and caused no nutritional and reproductive defects in white rats. Practical hints on compounding and feeding these rations are given. The necessity for minerals and vitamins in correct balance is shown and pathological conditions due to nutritional defects such as paralysis due to faulty protein diet, pregnancy disease, milk fever, stone in the bladder, and rickets are described. Food-borne diseases mentioned include anthrax. *Salmonella suipestifer* infection, is less prevalent in mink than in silver foxes; as in the latter it may complicate distemper, a good account of which is given. Parasitic diseases include coccidiosis, myiasis (principally *Wohlfahrtia vigil*), sarcoptic mange, flea infestation (*Ceratophyllus vison*), and various helminth infestations, for all of which preventive hygiene rather than treatment is advocated.

Useful concluding chapters deal with the quality and preparation of pelts and outline directions for submitting material for laboratory diagnosis, at the same time pointing out how this work is aided by a detailed history of the case.

The type, though small, is clear, but some spelling mistakes occur in the text. The numerous illustrations are very good.

—C. V. WATKINS.

SHRADER, J. H. [Ph.D., Formerly Director, Bureau of Chemistry and Food, Baltimore Health Department, Instructor in Biochemistry, School of Hygiene and Public Health, Johns Hopkins University]. (1939). **Food Control. Its Public Health Aspects. A Manual for Regulatory Officers, Food Technologists, and Students of the Food Industry.** pp. ix+513. 51 tables. [Numerous refs.] New York: John Wiley & Sons, Inc.; London: Chapman & Hall Ltd. [8vo] [24s.]

To the long list of food inspection text-books yet another, but nevertheless welcome, work is added; it has 20 chapters on the various kinds of foodstuffs and their handling in commerce. The subject is dealt with in a competent and well-balanced manner and the general layout is good. All types of food are discussed, but milk and its products occupy by far the major portion of the book. Tables are shown giving the analyses and vitamin contents of various foods.

Available knowledge is soundly summarized

in the main, but veterinarians may not accept unreservedly the statements on such subjects as brucellosis and tuberculosis infection from milk.

Extensive bibliographies are appended to each chapter.

The book will serve as a useful guide to lecturers and will doubtless prove a valuable work of reference in the library of all interested in food inspection.—H. E. BYWATER.

LINTON, R. G. [Ph.D., M.R.C.V.S., Professor of Hygiene and Vice Principal, Royal (Dick) Veterinary College, Edinburgh]. (1940). **Veterinary Hygiene.** pp. xix+499. 127 figs., 14 tables. [Numerous refs.] Edinburgh: W. Green & Son Ltd. [3rd Edit.] [8vo].

The third edition of Linton's "Veterinary Hygiene" is to be welcomed and the author is to be congratulated on the manner in which he has kept his book abreast of the times. It is a standard text-book on the subject and is the authoritative source of information on subjects pertaining to the provision of accommodation for animals.

The formation of the Animal Health Division of the Ministry of Agriculture and Fisheries in 1937 has led to changes in the administration of the Diseases of Animals Acts and Orders and has necessitated changes in the text dealing with this subject.

Water, sanitation, ventilation and building construction are dealt with in detail in special chapters, and the rest of the book is devoted to the application of hygiene in the control of disease. The printing and binding are up to the usual high standard.—W. A. P.

ADAM, L. C. [M.B., B.S., Assistant Medical Officer, Public Health Department, London County Council], & BOOME, E. J. [M.B., Ch.B., M.R.C.P., D.P.H., T.D., Principal Assistant, Medical Officer, Public Health Department, London County Council]. [Revised by]. (1940). **Notter and Firth's Hygiene.** pp. x+518. 94 text-figs., 16 plates, numerous tables, 2 appendixes. London, New York & Toronto: Longmans, Green & Co. [10th Edit.] [8vo] [12s. 6d.]

This book has run through ten editions in 36 years, so it has been well tested. The last revision of the text was made in 1921. A considerable amount of new matter has now been added. The main contents of the book are divided into 16 chapters covering general subject headings, those of greatest interest to readers of this *Bulletin* being on food, infection and disinfection, parasites and pests, and sanitary law.

Disease conditions of meat, infected milk, the parasites of animals that infect man, and law in relation to animal disease are dealt with very briefly in the chapters covering these subjects.

The book is a storehouse of information on all matters concerning human hygiene. It is a most useful reference volume for the veterinarian dealing with aspects of public health relating to animal disease.—W. A. P.

FRAZER, W. M. [O.B.E., M.D., Ch.N., M.Sc., D.P.H., Medical Officer of Health, City and Port of Liverpool, Professor of Hygiene, University of Liverpool), & STALLYBRASS, C. O. [M.D. (State Medicine), Ch.B., D.P.H., M.R.C.S., L.R.C.P., Deputy Medical Officer of Health, City and Port of Liverpool; Lecturer on Public Health Administration, University of Liverpool, and Lecturer in Vital Statistics and Epidemiology, Liverpool School of Tropical Medicine]. (1940). **Text-Book of Public Health.** pp. x+504. 64 figs., 37 tables. Edinburgh: E. & S. Livingstone. [10th Edit.] [8vo] [21s.]

This is the tenth edition of this book on public health its descent being traced from a volume entitled "Medical Police" that appeared in 1874 as an addendum to a text-book on forensic medicine.

In view of the great development of public health services during the last few years, much of the text has been re-written for the present edition. Of the 22 chapters, those of greatest interest to veterinarians are the ones on Port Health administration (operation of imported food regulations), nutrition and food inspection, and infectious diseases and disinfection. Milk is adequately dealt with in detail from many aspects.

Much of the contents of other chapters is of general interest to the veterinarian and the book will be of great value for reference purposes to all working in the public service.—W. A. P.

DILLING, W. J. [M.B., Ch.B.Aberd., M.P.S. (Hon.), Professor of Pharmacology and General Therapeutics, Liverpool University]. (1940). **The Pharmacology and Therapeutics of the Materia Medica. (Bruce and Dilling's "Materia Medica and Therapeutics").** pp. x+602. 1

appendix. London, Toronto, Melbourne & Sydney: Cassell & Co., Ltd. [16th Edit.] [8vo] [12s.]

The fact that this is the 16th edition of a compact compendium originally published in 1884 is a sufficient indication of its serviceability. It aims at providing students and practitioners with the modern facts upon the pharmacological actions, and with orthodox clinical opinions upon the relative therapeutic merits of accepted remedial agents. The new edition contains accounts of all the drugs which are widely used, and the opportunity has been taken to include those which have recently proved successful, such as sulphapyridine, stilboestrol, desoxycorticosterone, vitamin K, and berberine sulphate. New and substitute preparations, which became official in June, 1940, such as "oleum vitaminatum", the arachis oil preparation of calciferol and vitamin A concentrate are included in an appendix.

Official pharmacopoeial names are used for drugs previously described under trade names which, however, are still included, *e.g.* hexobarbitone soluble (evipan sodium) and suramin (germanin; Bayer 205).

The contents are arranged as an introduction, which includes such matters as signs and symbols, prescription writing, weights and measures; part I, the inorganic materia medica; part II, the vegetable and animal materia medica and synthetic preparations; part III, pharmacology and general therapeutics; and an appendix including an epitome of the Dangerous Drugs Acts, preparations in the latest addendum to the British Pharmacopoeia, and other useful matter.

For the convenience of students, drugs which have comparable pharmacological actions are arranged together, while the actions of various drugs influencing particular organs are considered under general therapeutics.

There is a good index and the compendium can be expected to continue its popularity.

—H. H. GREEN.

BARNARD, W. G. [F.R.C.P., Professor of Pathology, University of London, St. Thomas's Hospital Medical School; Formerly Pathologist in Charge of the Central Histological Laboratory, London County Council; Pathologist to University College Hospital, London; Junior Assistant Director of the Institute of Pathology at the London Hospital]. (1940). **Elementary Pathological Histology.** pp. 75. 181 figs. London: H. K. Lewis & Co. Ltd. [2nd Edit.] [4to] [10s.]

During the 12 years since the publication of the first edition, this book has proved its worth as a bench companion for medical and veterinary students. The present edition has been improved by the inclusion of three colour plates comprising eight figures of which three are coloured versions of the original black and white ones. It is a pity that the third colour plate should have but one small central illustration when there is room for three others which might well have included one of an infarct which would be so much more instructive if presented in colour. The text and the remaining figures remain unchanged. The inclusion of an index is a useful addition. The book is of considerable value to veterinary students during their course in pathology as an aid to the interpretation of histological sections; in the text there is also a brief but none the less useful account of the most important pathological processes.—E. G. W.

CONN, H. J. [New York Agricultural Experiment Station. Chairman, Commission on Standardization of Biological Stains]. (1940). **Biological Stains. A Handbook on the Nature and Uses of the Dyes Employed in the Biological Laboratory.** pp. 308. 7 tables, 4 appendixes. [Numerous refs.] Geneva, N.Y.: Biotech Publications. [8vo] [$ 3.40].

This very valuable work is sponsored by the commission on biological stains and affords a comprehensive and informative catalogue of staining technique. The fourth edition describes 13 new dyes not included in the third edition and one of the most noteworthy of these is chlorazol black E which CANNON advocated in 1937 for general histological and cytological work.

There are chapters on the history of staining, the general nature of dyes and their classification, and the theory of staining, all of which are each excellent résumés of their topics. The systematic treatment and compactness make for simplicity in reference, so frequently complicated by cross-references in books which cover similar ground. The work is enhanced by good appendices, bibliography, and index, which, together with the main body of the book, make it an indispensable handbook for research workers in the biological field.

—C. HORTON SMITH.

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